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COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

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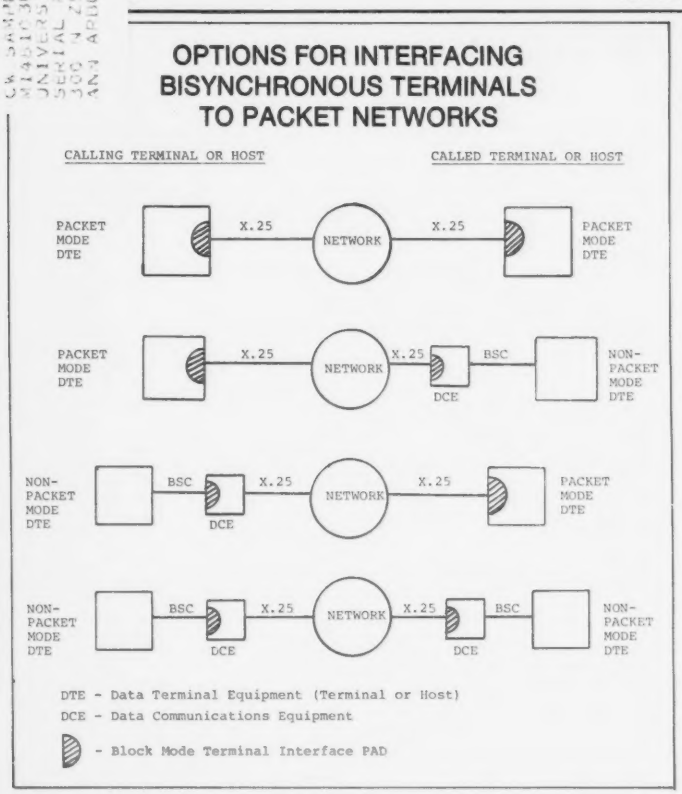

British DPers' Strike Crippling Government

By Rex Malik
Special to CW

LONDON — Selective strikes by government DPers here are bringing the government to a halt in several areas — and the job actions are escalating week by week.

The strikes reached such height last week that the social security operation was closed down for 48 hours and a key government tax agency was shut down completely, leading several sources to conclude that the present Labor Party government might not survive the vote of confidence scheduled for this week.

The two unions involved in the selective strike actions — the Society of Civil and Public Servants and the Civil and Public Services Association — have shut down at least 36 government centers. Thirteen of these are computer installations and the others involve computer-dependent operations.

The installations currently out of commission normally handle government revenues in excess of $52 billion a year and government expenditures of $26 billion per year, according to the unions involved.

The unions, which together represent about 60% of the central government's civil servants, have pulled computer operations, maintenance, software patching and data preparation staff only out of selected sites in their pay dispute with the government. Originally, the point of these actions was to cause the maximum disruption to government operations with the minimum disruption to the general public, according to the strikers. Operations responsible for payments of unemployment benefits, welfare payments and pension payments were therefore left in place at installations. In addition, installations such as those responsible for car licenses were kept in operation.

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Catching Up Won't Be Easy

Special to CW

LONDON — If the strike of government DPers ended tomorrow, it would be "at least two months" before the government's computer operations could get back to normal, according to a union source here.

Even that pessimistic estimate may be optimistic, however, according to other computer industry watchers. First, they noted, the strike is coming at the busiest time of the year for government DP operations, since the British government's fiscal and tax years begin on April 1.

Second, computer experts here indicated, the government's computer systems are very heavily loaded under normal circumstances and it would be difficult to find extra time to process the backload that is being built up during the strike.

"With very tight scheduling and concentrating only on the really important stuff, most centers might be able to gain one day a week," one source said. Therefore, for each week the strike is on, it would take five weeks to catch up, he said.

Private Packet Net to Back Use of 2780-Type Terminals

By Dr. Barry D. Wessler
Special to CW

Packet networks today are largely used to provide communications between host computers and low-speed asynchronous terminals. The user's best option for sending higher speed data from batch or synchronous interactive terminals has been to install dedicated access lines to the remote host.

Beginning this spring, Telenet Communications Corp. will take the first step toward providing packet-switching communications for the major classes of synchronous terminals in private network systems. Initial support will be for terminals using the IBM 2780/3780 protocol.

The 2780 protocol is currently being tested at a West Coast site where Telenet is installing a corporatewide packet network. This network was designed to support communications between multiple hosts of different manufacturers and a wide variety of synchronous and asynchronous terminals.

Current development efforts are being directed to building terminal handlers and terminal emulators for Hasp multileaving and 3270 protocols.

The CCITT X.25 protocol will provide the framework for this new development. It is important to distinguish at the outset that X.25 provides a communications protocol for computers and intelligent devices that are capable of operating in "packet mode." In order for a host to handle nonpacket-mode devices, such as asynchronous

(Continued on Page 6)

A CW Special Report on Data Communications Terminals follows Page 64.

Wiley Prediction Dooms Computer Inquiry II

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — The Federal Communications Commission's (FCC) Computer Inquiry II will fail in its attempt to draw a distinction between DP and communications services, a former FCC chairman predicted here last week.

Any line drawn between the two will quickly be made meaningless by advances in technology, which is what happened to the determinations made in the FCC's original Computer Inquiry. One immediate result will be the complete deregulation of the terminal equipment industry, Richard E. Wiley said at the Federal DP Expo here last week.

Tracing the history of the FCC Computer Inquiries, Wiley noted that "in 1969, recognizing the increasing interactions between data processing systems and communications, the commission initiated a Computer Inquiry to determine the extent to which its policies should be adjusted to meet the needs of burgeoning technology."

Guidelines that resulted from the first investigation, however, were addressed primarily to situations in which it was feared communica-

(Continued on Page 2)

Japanese Enter U.S. Mini Arena

By Brad Schultz
CW Staff

LEXINGTON, Mass. — Japan has aggressively entered the U.S. minicomputer market with the introduction of four 16-bit small business systems by a subsidiary of Nippon Electric Co.

Aimed at the first-time or distributed DP user, each of the NEC Information Systems, Inc. (Necis) models can reportedly achieve data transfers between workstations and the host processor at 1M bit/sec via a direct memory address (DMA) controller. Data flows from mass storage at 1.2M byte/sec through an integral disk controller.

The commercial minis offer upward compatibility and easy parts replacement and support because nearly all the components of the Astra models 210, 230, 250 and 270 — down to their semiconductor chips — are made by

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Cuts Prices of Other Models

CDC Adds High End to Omega 480

MINNEAPOLIS — Control Data Corp. has added a new high end to its Omega 480 series of IBM-compatible mainframes.

The Omega 480 Model III, introduced recently, uses 16K MOS chips to achieve performance levels comparable to the IBM 3031, according to a CDC spokesman. A minimum 2M-byte system will cost $360,000 when deliveries begin in the third quarter.

At the same time, the company announced one- and three-year leases for all Omega hardware as well as price reductions of 35% to 47% on the Omega 480 models I and II.

The Model III can accommodate 2M to 8M bytes of memory, with increments available in 2M-byte sizes at $60,000 per increment. The maximum configuration, which costs $540,000, occupies less than half the space occupied by a 1M-byte IBM 370/158, the spokesman claimed.

The channel configuration on the Model III is limited to one byte-multiplexer and five block-multiplexer channels. When all channels are operating at maximum, 7.5M byte/sec can be transferred, according to the spokesman.

Officials compared the system, with a basic memory cycle time of 50 nsec, to an IBM 3031 in terms of performance. No hard data is available on throughput rates, however.

Price Reductions

A 512K-byte Omega 480 Model I, formerly priced at $290,000, was reduced to $188,000, while a 4M-byte Model II, previously $690,000, now costs $369,000.

Monthly lease prices for these two systems were reduced to $7,207 and $14,145, respectively. Prices for systems on order but not yet delivered will be renegotiated, while lease prices for systems currently installed will remain unchanged until the termination of the present lease, the spokesman stated.

The Model III will lease for $13,800 to $20,700/mo on a one-year lease or $12,000 to $18,000/mo on a three-year lease.

Wiley Dooms Inquiry II

(Continued from Page 1)

tions providers might be using a central computer and remote, nonintelligent terminals to provide DP services — services regulated common carriers cannot offer legally.

The commission proceeded to define "data processing services" and "communications services" and ruled that common carriers could offer the former only through separate subsidiaries. It was a "good decision based on the then-existing reality," Wiley said, but "within a short period, things had changed so drastically that the legal distinction between data processing and message switching became technologically outdated."

Low-cost microprocessors allowed centralized computers to be replaced by distributed data processing systems that use intelligent terminals capable of both DP and communications functions. The regulatory distinction between computers and terminals made during Computer Inquiry I thus became obsolete. This prompted the commission to initiate its second Computer Inquiry in August 1976.

Wiley predicted the FCC will again be unable to draw any practical line between DP and communications in its investigation of terminals. And because it would be "unthinkable" for the FCC "to attempt the regulation of the huge and complex data processing market," the "only solution to this enigma," Wiley said, is for the FCC to conclude that terminal equipment of all types "need not, and should not, be regulated."

Wiley Not Alone

Wiley is not alone in calling for deregulation of terminal equipment. The National Telecommunications and Information Administration recently said such deregulation is also the policy of the Carter Administration.

But the future structure of the U.S. telecommunications industry may well be determined not by the FCC or the Administration but by Congress, which is moving full force into rewriting the Communications Act of 1934.

Ironically, while the FCC has been struggling for 10 years — unsuccessfully, according to Wiley — to separate DP and communications services, the Communications Act rewrite introduced two weeks ago in the Senate calls for the FCC to use that same determination as the basis for all future regulatory action [CW, March 19].

All of this would leave the FCC in a difficult position, as Wiley pointed out. Further rewrite legislation to be introduced soon in the House of Representatives is not expected to offer the commission much relief.

The previous version of the House bill called for the complete abolition of the FCC.

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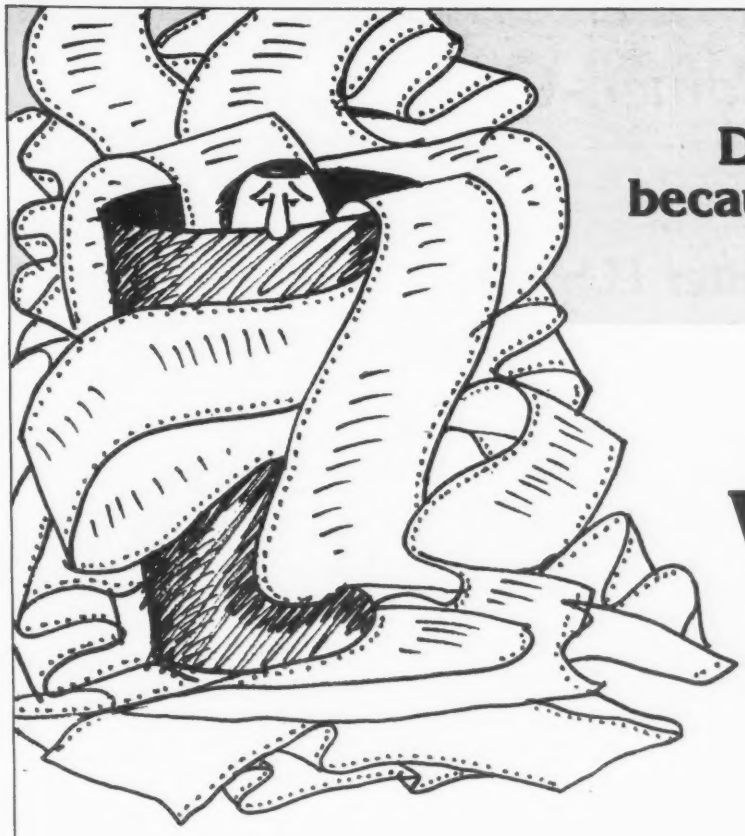

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Data Bank to List Women-Owned Businesses

By Ann Dooley
CW Staff

WASHINGTON, D.C. — The National Association of Women Business Owners is developing a data bank of women-owned businesses that will be available on time-sharing basis.

The information will also be published in four metropolitan directories, according to Cathy Irwin, project director.

Similar to a data bank that was set up to identify minority-owned businesses, this data bank will allow women the chance to locate and do business with women-owned firms, Irwin said.

Funded by The Equitable Life Assurance Society, the data bank and metropolitan directories will provide a specific business profile of each company so that anyone interested can match a specific company to his needs. The data bank can be used to fit company size, output capacity or geographic area to the consumer's requirements, Irwin said.

Included in the data bank will be information on what year the company started, the number of employees, what commodities or services it deals in, its production capabilities and its sales volume.

Ready in June

The data bank, which is expected to be operational by June, will be run in time-sharing mode through Andover Data Services in Gaithersburg, N.Y. Those interested in obtaining information about women-owned businesses of a certain type or in a certain area can contact the association, which will retrieve the information from the system in Gaithersburg.

The metropolitan directories, which will be available on request, are scheduled to be published by May.

Although the data bank and directories will eventually be available on a national scale, the organization is currently concentrating on only four cities. Questionnaires have been sent to women business owners here and in Baltimore, Chicago and Boston to elicit business profiles.

The association has had responses from as many as 1,500 businesswomen in each of the cities so far, Irwin said.

There is no charge to be listed in either a directory or the data bank. Irwin encouraged women business owners or those interested in contracting with women-owned businesses to contact her or Chris Pulford at the National Association of Women Business Owners, 200 P St. N.W., Washington, D.C. 20036.

Japanese Enter U.S. Minicomputer Arena

(Continued from Page 1)

Necis or some other affiliate of Nippon Electric, a Necis spokesman claimed.

Among the domestic systems cited by Necis as Astra competitors are IBM's System/34, Burroughs Corp.'s B80, Univac's BC-7, Data General Corp.'s CS/20, CS/40 and CS/60 and Digital Equipment Corp.'s Datasystem 320 and 350 series.

The Astra 210 is a single-workstation system with a main memory capacity of 128K bytes. The Astra 230, 250 and 270 support up to four, 16 and 32 workstations, respectively.

Both the 230 and 250 have top main memory capacities of 256K bytes, while the Model 270's maximum main memory is 512K bytes.

Up to four dual-sided, double-density floppy diskette drives can be added to the Astra 210 and 230. Unlike floppies of this type from other vendors, the 1M-byte Nippon Electric drives "do indeed work," the Necis spokesman maintained.

Up to four of Nippon Electric's Winchester-type fixed disk drives can be added to the Astra 230, 250 and 270. The 230 can accept 20M-byte fixed-disk drives for a maximum mass storage facility of 80M bytes. The 250 can accept a combination of 20M- or 40M-byte drives for a total 160M bytes.The 270 can support 80M-byte drives for a high-end 320M-byte storage facility.

Micro at Heart

The central processor of the Astra 210, 230 and 250 is Nippon Electric's Model 1600 microprocessor, which features 114 commerical instructions and an 800 nsec cycle time. The user can add a number of 1600s to support expanded data communications functions, Necis stated.

The Astra 270 employs a bipolar processor that is hardware- and software-compatible with the 1600, the spokesman added. All Astra memory devices use Nippon Electric's 16K-byte random-access memory chips. All peripheral controllers are integrated within the system chassis and feature LSI circuitry.

The Astra DMA bus allows each workstation's 2,000-character CRT screen to be completely filled in .016 sec, according to the spokesman. The multitasking Astra software was said to eliminate the need for an operator console.

Each intelligent workstation employs a Z80 microprocessor built by Nippon Electric and includes 32K bytes of memory, a CRT screen and a typewriter keypad. Separate refresh memory, attribute storage and operator-generated horizontal and vertical lines for format definition allow the station to perform many screen prompting and editing functions without host processor support, the spokesman said.

Astra Software

The Astra series' multitasking Interactive Executive System provides each system with a "fully protected" multiuser environment that encourages maximum use of transaction processing facilities, or mixed transaction and batch operations, without requiring specialized staffing, the vendor claimed.

The systems feature Ansi Cobol-74 and a version of Basic that reportedly facilitates program development, file management and data communications. Macro assembler is also included.

The Astras also come with a data management system that provides formatted data entry, file management capabilities, report generation and "English-like" query capabilities. "Evolved over the past decade, the data management system uses simple operator screen prompts that make it usable by almost anyone with minimal training," the vendor maintained.

Further, Astra users can also choose any combination of five different file organizations: sequential, relative, indexed, partitioned or queued linked files.

Commercial Applications

Necis has written commerical applications packages for Astra users, including sales order processing, sales analysis, inventory control, accounts receivable, accounts payable, general ledger and payroll.

To support the on-line data transmission requirements of increasing numbers of commercial users, the Astra family will initially offer five communications software capabilities. They include a Nippon Electric protocol to support Astra remote workstations; emulation software for IBM 2780 and 3780 batch transmission; Hasp remote job entry functions; and IBM 3270 binary synchronous interactive communications.

Astra users can communicate with Necis' 55 char./sec Spinwriter printers and other terminal devices in asynchronous mode at up to 9,600 bit/sec, the vendor said.

Available utilities include sort/merge, which can be called from the featured programming languages; debugging aids; a text editor; program patch; copy/compare; print; dump/edit; file dump; data transcription; and file formatting.

Support and Prices

Sales and systems support for the Astra family will be through a North American network of dealers and direct Necis sales offices. Customer maintenance will be provided by Necis and third-party contractors.

Necis has already begun to use Astra systems internally. Customer shipments are slated to begin in June; thereafter, deliveries will be made within 60 days of order, the vendor said.

The Astra 210 is priced at $13,200 with a 1M-byte diskette drive and printer. An Astra 230 with one workstation, 2M byte of diskette storage and a printer costs $17,080.

An Astra 250 with one workstation, 1M byte of diskette storage, 20M bytes of fixed-disk storage and a printer costs $38,980. Prices for the Astra 270 start at $53,780.

Necis is located at 5 Militia Drive, Lexington, Mass. 02173.

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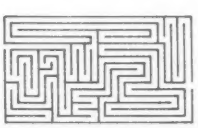

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DEC Tops Vendor List in Federal DP Inventory

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — In line with the general trend in data processing today, small computers are accounting for an increasing percentage of the DP equipment acquired by the federal government, according to General Services Administration (GSA) figures.

Statistics compiled by GSA's Automated Data and Telecommunications Service (ADTS) show that as of last Sept 30, Digital Equipment Corp. accounted for 24.5% of the computers in government use. Of the 12,190 CPUs in federal service (up from 11,124 the previous year), 2,992 are of DEC manufacture.

That figure means DEC is the major provider of processors to the government.

Univac is second with 14.4%, or 1,749 machines, and IBM is third with 9.7%, or 1,179 units installed.

IBM's share of the federal market has dropped steadily since 1965, when the company accounted for 42.3% of installed CPUs. But IBM components still account for more federal dollars than those of any other computer vendor; IBM equipment is worth $1.353 billion of the government's total $4.888 billion of purchased and leased DP components, the GSA found.

The GSA statistics, which are compiled annually and will be available to the public by the end of April, showed the government using 9,299 computer systems comprising the 12,190 CPUs. Following DEC, Univac and IBM, the order of company representation was Honeywell, Inc. and Data General Corp., each with 7.3% of the total, or 891 mainframes; Hewlett-Packard Co. with 6.7%, or 814 machines; and Control Data Corp. with 4%, or 492 CPUs.

Modular Computer Systems, Inc., Burroughs Corp. and Xerox Corp. each had 2% to 3% of the total government inventory of CPUs.

Two Classifications

ADTS broke down the number of CPUs in use as of last September into two classifications: "general management" computers, of which there were 7,642, and "special management" computers, of which there were 4,542. A GSA spokesman explained that the "general" category covers "business-oriented systems" and the "special" category includes mainframes installed in classified locations, used for control purposes and on board ships and planes.

Of the 11 civilian agencies listed, the Department of Energy (DOE) was found to be the largest user of computer systems (CPUs plus peripherals), with a total of 2,395; the National Aeronautics and Space Administration (Nasa) was a distant second with 489.

Except for Nasa, DOE uses more systems configured with five or more CPUs than any other agency, civilian or military, according to the GSA. DOE was found to be using 51 multi-CPU systems, while Nasa accounted for 69.

The total number of government DP systems is evenly divided between the civilian and military agencies, with civilian organizations using 4,764 systems and Department of Defense (DOD) branches having 4,535. Of the DOD systems, the Air Force had

(Continued on Page 6)

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	1965		1970		1975		1978	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
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CONTROL DATA CORP.	249	10.3	404	7.7	541	6.3	492	4.0
DIGITAL EQUIPMENT CORP.	14	0.6	500	9.5	1,699	19.6	2,992	24.5
DATA GENERAL CORP.	—	—	—	—	372	4.3	891	7.3
HONEYWELL, INC.	106	4.4	298	5.6	706	8.2	891	7.3
HEWLETT-PACKARD CO.	—	—	—	—	361	4.2	814	6.7
IBM	1,020	42.3	1,397	26.4	1,320	15.3	1,179	9.7
MODULAR COMPUTER SYSTEMS, INC.	—	—	—	—	—	—	359	3.0
UNIVAC	488	20.1	1,198	22.7	1,368	15.8	1,749	14.4
XEROX CORP.	14	0.6	229	4.3	360	4.2	308	2.5
OTHER	360	15.0	1,047	19.9	1,607	18.5	2,243	18.4
TOTAL	2,412	100.	5,277	100.	8,649	100.	12,190	100.

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Packet Net to Support 2780-Type Terminals

(Continued from Page 1)

terminals or terminals like the 2780s and 3270s that communicate in block mode, a higher level protocol must be implemented within X.25 software to perform protocol conversion.

The existing X.25 software packages for various computers such as large-scale IBM and Burroughs Corp. CPUs, Digital Equipment Corp. PDP-11s, Prime Computer Inc. processors and others, provide what is called an interactive terminal interface (ITI) so that hosts can handle multiple asynchronous terminals very efficiently over one or more X.25 links to a packet network. Compatible ITI software for this class of terminal is provided at network nodes within the public packet network. This interface has been standardized by the Consultative Committee on International Telephone and Telegraph (CCITT) and is referred to as X.3 and X.29.

However, there has not been as much activity in implementing the higher level protocol within X.25 which would make it possible for hosts to communicate with the so-called "block-mode" terminals. Rather, manufacturers have been expected to develop entirely new terminal products that communicate directly to the packet network via X.25.

Because of the large investment users have in existing terminal hardware, Telenet has decided to offer a terminal emulation type of interface that will make it possible for the most common classes of block-mode terminals to use packet networks, regardless of the availability of manufacturer-supplied X.25 interface software.

The vehicle for performing the necessary protocol conversions to X.25 is the TP 4000, a multimicro-based processor developed by Telenet. Within the TP 4000 are synchronous packet assemblers/disassemblers (PADs) for each terminal class. The PAD is a set of software modules that performs conversions from one protocol, such as 2780, to X.25. The synchronous PAD is referred to as a block mode terminal interface (BMTI).

To illustrate, the technique for mapping bisynchronous 2780 procedures into X.25 procedures involves the design of parameters for transmitting control information between the host and terminal. Data is transferred using a minimum of control information both in the data block and in the qualified data packets. The terminals are expected to do the blocking of the data. The BMTI PAD forms these data blocks into packets, or vice versa.

The design goal of the BMTI protocols is to remain as transparent as possible to the user. Generally no software or hardware modifications are required to user facilities to include the network into the communications link.

When a packet network is superimposed between the sending and receiving device, a BMTI PAD is required at each end. The PAD local to the terminal or host is responsible for the major functions of controlling the native transmission protocol. Data integrity, flow control, cyclical redundancy check errors, timeouts and requested delays by the terminal or host are handled locally.

The other end of the call generally will not see these events. If the PAD gets into an unrecoverable state, the other end will be informed and the call will be reset to a known state or be cleared.

Other Advances

Other companies are also making advances in developing BMTIs that will be compatible with X.25-based networks. For example, Cambridge Telecommunications Corp. (CTX) of Burlington, Mass., has announced availability of a terminal handler and host X.25 package for 3270 devices and IBM hosts with 3704/5 front-end processors. In this case, the BMTI PAD is built into an X.25 software package called DMEP running directly in the host front end. At the remote end, the terminal handling PAD is incorporated into a hardware device that converts the 3270 protocol into X.25 for transmission to the network.

While the CCITT has defined higher level protocols within X.25 for the ITI (X.3, X.28 and X.29) and process to process procedures (Open System Architecture), it has not defined the standards for the BMTIs. In fact, the CCITT is not expected to do so since these protocols themselves are not recognized as international standards. But X.25 does provide the framework for the development of these and other "private protocols" and they are expected to be defined by the common carriers, manufacturers and users.

Telenet recognizes the importance to users of standardizing various BMTI protocols worldwide. This compatibility is extremely important since many large users have multinational data communications requirements. To encourage standardization, Telenet is working closely with other vendors and carriers such as Bell Canada and the Japanese Telegraph and Telephone Corp. and plans to publish the BMTI specifications and make them available to other carriers, manufacturers and software suppliers.

With the completion of development work on PAD interfaces for each major class of synchronous terminals, it will become technologically possible for X.25-based public networks to support higher speed data transfer to and from existing terminals. Telenet is presently studying the user characteristics and market demand for such a service.

One major change likely to occur in public networks within the next few years will make such applications as remote job entry and bulk data transfer even more attractive. That change is an increase in the backbone trunk speed from 56K bit/sec to 1.544M bit/sec (the speed of T1 digital trunks).

With T1 carrier trunks, the trunk transmission delay in the network will drop from its present 100- to 200 msec to 10 msec plus propagation time. It is expected that there will be a significant price decrease in packet traffic charges accompanying this change.

Wessler is vice-president at Telenet Communications Corp. and is an authority on packet network protocols and standards.

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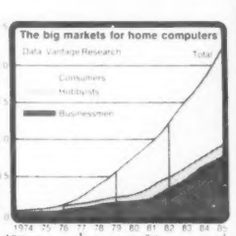

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DEC Tops U.S. Inventory

(Continued from Page 5)

1,704, the Army 1,126 and the Navy 1,473. An additional 232 systems were listed as "other DOD."

As sellers to the military CPU market, Univac led the pack with 1,191 units; DEC and IBM tallied second and third with 694 and 643 machines, respectively; Honeywell accounted for 580 CPUs; while Burroughs, CDC, Data General Corp. and Hewlett-Packard installed between 250 and 400 machines each.

Xerox showed surprising strength in the military CPU market, with 115 units. In the civilian agencies, the bulk of Xerox mainframes were found in use at Nasa — 124 units — and DOE, which has 44. An additional 25 Xerox CPUs were scattered among the other civilian agencies.

DEC on Top

In the civilian agencies, DEC accounted for the majority of CPUs, with 2,298. No other manufacturer was even close — DG, HP, IBM and Univac provided between 500 and 600 units each.

ADTS said the government's DP systems included 55,246 "storage units" (core memories, tape drives, etc.) for which it had spent some $1.7 billion in lease and purchase costs. GSA counted 67,446 "input/output units" (printers, plotters, CRTs, etc.) representing $940 million in expenditures and 64,491 communications terminals worth about $318 million in vendor income.

Of these components, the overall ratio of leased to owned was about 2:1.

CDC, DEC, Honeywell, IBM and Univac were about even as suppliers of memory units, but IBM was found to be far and away the most common name in government "input/output units," with 11,054 units. The closest competitor to IBM in this second category was Univac with 6,493 units, followed closely by CDC with 5,857.

DEC, Burroughs and Honeywell each accounted for about 4,500 of these peripherals.

CDC was the big name in communications terminals with 9,760, followed by Honeywell with 9,209. Burroghs, IBM and Univac had installed between 4,500 and 5,000 each.

In total government components, including CPUs, IBM was found to be the biggest supplier with 51,581 pieces of equipment. CDC, Honeywell and Univac supplied between 20,000 and 24,000 units each.

Additional findings in the GSA survey were:

- While IBM accounted for the largest dollar total of government DP equipment — $1,353 billion, the company was followed — in round figures — by CDC with $740 million; Univac, $656 million; Honeywell, $481 million; Burroughs, $272 million; DEC, $196 million; Xerox, $115 million.

HP, DG and Modcomp were at the bottom with $48 million, $29 million and $23 million, respectively. Various "other" suppliers accounted for $970 million in government DP components.

- The federal government had, as of last Sept. 30, $148.4 million worth of CPUs costing less than $50,000 each; $218.5 million in machines costing between $50,000 and $200,000; $300 million of mainframes costing $200,000 to $500,000; $348 million of units worth $500,000 to $1.5 million; and $577 million worth of CPUs costing more than $1.5 million.
- In all the price ranges listed, the government owned more CPUs than it leased. As might be expected, the ratios of owned to leased were higher in the smaller computer categories.

The government owned 418 and leased 1,842 of its CPUs costing less than $50,000 each. Of CPUs worth more than $1.5 million each, the government owned 104 and leased 48.

Controllers 'Sweating Blood'

With Plane in Trouble, Denver System Fails

By Marguerite Zientara
CW Staff

DENVER — An air traffic control computer went down for two and a half hours at Stapleton International Airport here recently because of hardware problems, hampering the landing of a Frontier Airlines plane with engine trouble and disrupting other arrivals and departures.

"A lot of guys were really worried for a while," said Michael Harp, one of the 16 air traffic controllers on duty on St. Patrick's Day, when the computer failure resulted in the loss of alphanumeric displays on their radarscopes. "They were sweating blood."

While radar continued to indicate the locations of aircraft, controllers were without the computer-generated alphanumeric displays that indicate an airplane's altitude, speed and flight number.

Faulty Cards

The airport's Univac mainframe, with 64K bytes of memory, was found to have two faulty memory cards: Read Enable and Store & Write, according to Paul Van Houweling, data systems officer. The computer has no model number, he explained, but is an off-the-shelf machine formerly used on Navy aircraft carriers for tracking purposes.

While the computer was down, a Frontier Airlines twin-engine turboprop on a flight from Denver to Steamboat Springs, Colo., experienced overheating problems in one engine and the pilot decided to return to Denver. With one engine shut down and 50 passengers on board, the plane was preparing to land from the east when the wind shifted, causing difficulties in landing on its assigned runway.

"Without assistance from the usual computer readouts, the controller had to do a lot of fast talking to bring the plane in safely," Harp said.

The system first went down at 12:02 p.m. on Saturday for about 40 minutes and then went down again at 3:38. The system came up at 4:58, however, on a "non-certified, test basis only," Van Houweling said.

At 8:39 that evening, the system went down once more and stayed down until 4 a.m. Sunday morning while maintenance workers diagnosed and fixed the troublesome parts.

The system was recertified by maintenance workers at 8:10 Sunday morning and has been "on the air ever since," Van Houweling said.

Extreme Tension

While Denver has experienced only seven computer outages in two years, usually lasting one or two minutes each, and while the system overall has "fantastic reliability," according to Harp, the combination of no alphanumeric display, heavy air traffic, an airplane in trouble and shifting winds caused extreme tension in the control tower on March 17.

"Although the computer was down, we still had primary and secondary radar," Harp said. "There was no decrease in safety or in radar separation [of planes], but the situation caused headaches because of the complexity of Denver's situation."

With the nearby Rocky Mountains as a constant consideration, for example, added to the other unusual factors on March 17, the real problem was the loss of the controllers' ability to coordinate these things by computer.

Coordination Nightmare

"We had to manually hand off the airplanes, we had to continually ask pilots their altitudes, we had to keep yelling at each other across the room to find out which planes were which," Harp said. "It was a coordination nightmare.

"Air traffic control can be done without computer coordination, but when you're working with it and it goes, it's hard to readjust your thinking."

Problem With Separations

Delays occurred when the Departure Room called for five-mile separations between departing airplanes. On a day with high visibility, planes can be run at 1.5- mile separations, but the normal minimum separation is three miles. Five-mile separations between planes slow things down considerably, Harp said.

While Denver currently has no computer or radar backup systems, a dual computer system is scheduled for installation next February.

"That will be great if it happens," Harp said, adding that the Professional Air Traffic Controllers Organization's Denver chapter has been requesting such a backup system from the Federal Aviation Administration for the last two years.

Although air traffic can be controlled without a computer, "the computer just makes it so much easier to handle it. Without the computer, there will be delays and slowdowns because of safety," Harp said.

Correction

The American Bar Association, not the American Bankers Association, received the report on consumer acceptance of electronic funds transfer [CW, March 12].

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Wages the Main Issue in Strike of British DPers

By Rex Malik
Special to CW

LONDON — The current dispute between government DPers and the government which is crippling operations here concerns the issue of wages.

Both unions involved — the Society of Civil and Public Servants (SCPS) and the Civil and Public Services Association (CPSA) — claim that the government is stalling on pay increases that would bring their salaries for similar work in line with salaries in the commercial world.

The SCPS represents supervisory civil servants and programmers, while the CPSA represents operators and data preparation staff workers in government jobs here.

Currently, the government's pay policies appear to be in a shambles, since most employers — except for the government itself — are apparently ignoring the government's voluntary guidelines for pay raises. The government's pay levels have therefore gotten out of line with those in the commercial sector.

Several years ago, an independent body known as the Pay Research Unit was established to provide data comparing the pay scales of the civil service and the commercial world. The research unit — and the understanding that each side would be bound by its findings — was a key factor in preventing public service strikes while government wages were keeping pace with the rest of the economy.

The unit's findings for the current period have been available since last November, and the unions here are charging that the government is ignoring them.

While the government is trying to hold the line on pay increases at well under 10%, the SCPS claims that its members need increases of 20% to 25% in order to stay competitive. In addition, the CPSA claims a 36% difference exists between the wages paid for commercial and government work.

The government, however, said any pay increases will have to come in stages through 1980. The next round of pay settlements and equalizations is also scheduled for that year, however, so there are questions on how much and how long the staging will affect next year's round of negotiations.

Presently, the government is sponsoring temporary legislation to force people back to work or let them go. These measures have angered the unions even more, causing them to spread the walkout to new DP centers.

Will Revenue DPers Join Strike?

Special to CW

LONDON — One of the major questions plaguing British decision makers here during the strike by government DPers is whether the Inland Revenue Service will be shut down.

That unit — which collects all personal income taxes and is analogous to the U.S. Internal Revenue Service — has an independent, in-house union to which most of its employees belong. The union is believed never to have taken part in a job action.

Same Boat

However, its workers feel they are in the same boat as other government DPers in that their salaries are not keeping pace with the growth of salaries in the commercial sector.

The executive committee of the union originally decided — reportedly by a very narrow margin — not to participate in the strike, but the federation's general secretary last week indicated the members' patience was "running out."

The union had scheduled a new vote for last Friday to decide whether to shut down the computer operations of the government's tax collection system. Sources close to the situation indicated the vote was too close to call.

Strike Crippling Government Operations

(Continued from Page 1)

However, when the government fired 39 workers for striking last week, the unions reacted angrily, shutting down the country's massive social security operation at Newcastle for 48 hours. In further protest, they pulled their people out of local social security offices that had been mailing payments already processed by the computer operations.

In addition, the unions pulled all of their employees out of the Customs and Excise Center at Southend, where previoiusly only computer staff had been on strike. This center controls the key element in the British tax system, the collection of the Value-Added Tax (VAT), and is considered critical by the unions.

Heating the VAT

Most of the picketing in the strike so far has taken place in Southend, and high union officials are on the scene.

Under VAT, each manufacturer pays a tax on the value added to a product by the previous manufacturer until the product is complete and shipped to a consumer. The consumer they pays the tax on the total "value added" by all the manufacturers in the chain, and the intermediaries are reimbursed for their contributions.

The systems at the Southend center process the collection of taxes, which average approximately $1 billion per week, and pay out more than $200 million weekly.

Originally, the unions had pulled out only 140 people, among them operators, data preparation and computer maintenance staff. They had also stopped mail operations here when they found that two of the customs commissioners were going in to remove mail bags.

With the action last week, however, the unions have taken 2,000 people out of the center, forcing it to a standstill.

The VAT collection process is a running process and is critically dependent upon the keeping of records. Those in the middle of the manufacturing chain in particular, who pay in and then receive refunds, need to know where they stand in the process at all times.

But with the staff out at press time, it appears that the British Post Office is refusing to deliver mail to the center because postal workers won't cross the picket lines.

The center was running four International Computers Ltd. (ICL) 4/72s, which are ICL upgrades of the RCA Corp. Spectra 70 line. One of the systems was being used for on-line work, but the center was primarily batch-oriented.

Other Centers Down

While the VAT center is the most critical computer operation currently shut down, several other important centers are also closed and those currently in operation are running on a "work to rule" and "no overtime" basis. Among the important centers shut down are:

• Ernie at Lytham St. Annes. This center processes the "premium bonds" for a setup similar to a state lottery. The bonds pay no interest, but bond holders take part in a monthly drawing.

This was the first system closed down in late February, when 84 computer staff members went on strike. Ernie was paying 120,000 prize winners a month an equivalent of $12 million.

• The Ministry of Agriculture, Food and Fisheries at Guildford. This center is responsible for paying grants and subsidies to farmers at a rate of approximately $12 million weekly. It is also used to collect statistics for submission to the European Economic Community.

These statistics form the basis for annual UK collections of between $400 million and $600 million as part of the European Common Agricultural Policy.

• The Scottish Agricultural Office at Edinburgh. This system plays the same role for Scotland as the Guildford system does for the rest of the UK. In addition, it handles legal aid payments to the legal profession, student grant payment and fishery quota statistics that are vital to Scotland's deep sea fishing industry because of international restrictions on the number and type of fish that can be caught at any time.

• The Department of the Environment system at Hastings. This center processes and pays office furniture and supply contractors as well as government building contractors. These services were paying out approximately $30 million per week before the shutdown.

• The Paymaster General's Office system at Crawley. This installation is responsible for government payments and plays a substantial role in the control of expenditures by giving government departments the authority to initiate individual payments.

In addition, it is responsible for processing some of the key statistics for the government's annual budget, which is due at the beginning of April.

• The Department of Education and Science at Darlington. This department pays close to $10 million a week to universities and produces educational statistics for the country. It is also used for Rate Support Grant calculations, which are made in June each year.

The central government supports local governments through these grants, which can account for as much as 60% of some of the local administrations' budgets.

• The Financial and Audit Division of the Department of Trade in Cardiff. The systems there control the payment of development grants to industry and to nationally owned industry and to nationally owned industries such as the coal, electric, gas and rail companies. The center handled payments amounting to $100 million weekly and is a key source of financial statistics.

• The Export Credits Guarantee Department at Manchester. This center processes guarantees for exporters. Last year $3 billion in exports were covered.

• The Financial System of the Scottish Office in Edinburgh. This system is responsible for 85% of all payments made by the Scottish office, handling sums approaching $60 million a week. The walk out of five key staff members shut down the entire center.

• The Ministry of Defense center at Chorley. Approximately $400 million was paid out from this center weekly to government contractors. The center played a key role in prodution control in ordnance factories and in the control of movements of dangerous materials.

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Worried About Dangers to Health

CRTs at UN Prompt Workers to Walk Off Jobs

By Ann Dooley
CW Staff

NEW YORK — As many as 250 United Nations typists and translators walked off their jobs recently and refused to return for three weeks in a protest against possible dangers to their health and safety stemming from the UN's recent introduction of CRTs.

Although no UN employees have suffered any ill effects, they fear long-term radiation damage resulting from the use of CRTs.

The employees agreed to return to work after being allowed to choose whether to use the CRTs or typewriters. Currently, about 25 volunteers are using the CRT equipment, while the rest of the staff is using its traditional typewriters.

No reprisals will be taken against any of those who refuse to use the CRTs, the administration said. The UN has begun a study to determine if a substitute can be found for the cathode ray tube equipment — the focal point of the radiation damage fears.

Only the conference typists, those who work in English, Spanish and French, the references unit typists and the translators were slated to switch to the CRTs. These employees work under extreme pressure, often up to 13 hours a day, and the CRTs — Wang Laboratories, Inc. word processing machines — were introduced to ease production burdens and cut down on the pressure, according to George Davidson, undersecretary general for administration and management.

Niosh Study

Claims that CRTs can cause radiation damage have been made by a number of different employee groups as CRTs were phased into their work places.

In 1977, two employees at *The New York Times* maintained that working with CRTs caused cataracts in their eyes [CW, Aug. 1, 1977]. At the request of the Newspaper Guild, the National Institute of Occupational Safety and Health (Niosh) performed a study which found little or no radiation — none beyond the recommended safety levels - emanating from CRTs.

Despite this study, many experts and lay people have doubts about the safety of CRTs. Staff members at the UN are now questioning the Niosh study, claiming that the agency failed to measure X rays directly emanating from the CRT screen.

Officials at Niosh, however, denied this and are standing by their original study.

Although agreeing to staff demands about the CRTs for the present, the UN administrators abide by the findings of the Niosh study and argue that thousands of workers elsewhere use the CRTs on a daily basis with no discernable health problems.

Employees Not Consulted

UN administrators admitted some of the complaints stemmed from the failure to consult employees before making the original decision to introduce CRTs. While employees are very concerned about radiation hazards, as well as eye fatigue and other physical problems, the walkout seemed to have arisen in part from poor employer/-employee relations.

Once the agreed-upon study is completed, the administration will review the results and decide whether to abandon the CRTs for some other type of equipment. But cost and efficiency will have to enter into the decision, Davidson said.

UN staff members, on the other hand, contended that although staff members have suffered no physical ailments from the CRTs, the possible long-term dangers are unknown, and they will continue to refuse to operate the machines. "If we're not qualified to say they're unsafe, then management is not qualified to say they are safe," one staff member said.

Even radiation experts are in disagreement about the dangers of CRTs. The main focus of their arguments seems to be not whether radiation is coming from the CRTs, but rather what constitutes a safe level of radiation.

Joseph A. Califano, secretary of Health, Education and Welfare, recently recommended that Americans try to avoid contact with excess amounts of radiation. But some experts contend that not only would Americans have to avoid CRTs, they would also have to refrain from watching TV or even going outside, where radiation occurs in a natural state.

Many of the radiation problems are blown out of proportion, according to Gene Moss, Noish health physicist. Much of the physical discomfort associated with using CRTs can be solved by proper lighting, shorter working hours, less stressful working environments, more comfortable chairs and the reassurance that the machines will not replace the employees, Moss recommended.

Many questions remain unanswered, he admitted. For example, it is unknown whether it is more dangerous to be exposed to a certain amount of radiation over a certain length of time or the same amount of radiation in a short space and then not again for a number of years.

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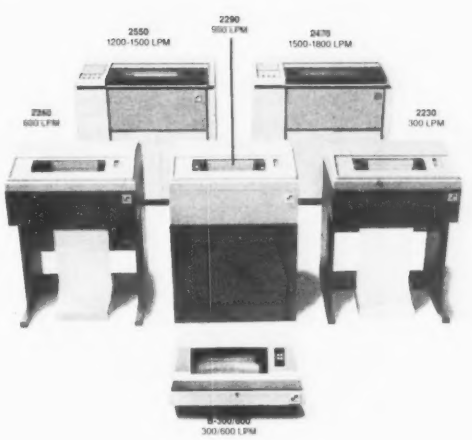

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Hearings on Medical Data Privacy Approaching

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — The confidentiality of medical records will be the first privacy issue taken up by the 96th Congress, with hearings scheduled for next month in the House of Representatives.

Medical records are covered extensively in several of the dozen or so privacy bills already introduced in this session of Congress. More legislation is expected to be introduced soon — when the Administration sends its privacy legislation package to Capitol Hill.

The House Subcommittee on Government Information and Individual Rights has tentatively scheduled four or five days of hearings on the issue for the first two weeks of April, according to subcommittee staff director Timothy H. Ingram.

The House panel will be considering legislative safeguards of medical records privacy primarily as proposed by Congressmen Richardson Preyer (D-N.C.) and Barry M. Goldwater Jr. (R-Calif.).

Preyer's omnibus Right to Privacy Act, originally introduced in 1977 as H.R. 10076, was reintroduced in the 96th Congress late last month with a revised section on medical records. The bill, now known as H.R. 2465, was revised following hearings last May.

The bill is co-sponsored by Goldwater, who has also introduced separate medical records privacy legislation. The two bills are based on the recommendations of the July 1977 final report of the Privacy Protection Study Commission.

Senate Bill

Sen. Jacob Javits (R-N.Y.) introduced similar legislation in the Senate on March 1. His bill, which is representative of the approach Congress is taking to medical records privacy, includes the following provisions:

- Individuals would be guaranteed access to their records and the right to amend inaccurate or incompleted records.
- The burden of keeping the records confidential would be placed on the record-keeper, in this case usually a hospital, clinic or public health service.
- Medical records could be released only on the authorization of the individual.
- The government could gain access to an individual's medical records only through specified legal actions. The government would have to first notify the individual that his records were being sought and advise him of the legal steps he could take to try to stop the government's investigation.

This last provision concerning government access is modeled on the Right to Financial Privacy Act passed last year with the backing of the Administration and the Justice Department in particular.

The Javits bill is similar to the legislation now before the House, although the several bills call for different methods of securing the confidentiality of medical records. For instance, the Javits bill would amend the Privacy Act of 1974, while the Goldwater legislation would amend the Social Security Act.

Goldwater's bill would affect all medical care providers receiving funds under the Medicaid or Medicare program. Almost every medical care service in the country thereby is included.

Hybrid Version Likely

Any final version of medical records privacy legislation will probably be a hybrid of the different approaches. "All of this is in a very preliminary state," Ingram said, predicting the House will wait until hearings are held to make a decision on any legislative action.

Ingram also said the Senate is not likely to take up the issue until it sees what action the House is taking and how much interest is being generated on the subject.

The legislation already has strong support in the House in the persons of Preyer, chairman of the Government Information and Individual Rights Subcommittee, and Goldwater, who was a member of the Privacy Protection Study Commission.

In the Senate, the Javits legislation is co-sponsored by Sen. Abraham Ribicoff (D-Conn.), chairman of the Senate Governmental Affairs Committee. That committee is likely to be the first Senate body to consider the issue of medical records privacy, according to Ingram.

In addition, the Administration's privacy package will contain provisions for medical records, adding support for such legislation.

However, the bills now before Congress are either wholly or in part identical to measures introduced in the last Congress. Several days of hearings constituted the only substantive action taken at that time.

DP Training Seen Leading Inmates to Computer Crime

By Brad Schultz
CW Staff

NEW YORK — Federal agencies sometimes launch convicted felons on careers in computer crime by offering prison inmates DP training as well as access to income tax and other sensitive federal data banks, according to Sen. Abraham Ribicoff (D-Conn.).

The Senate investigation of federal computer security Ribicoff directed last year found the Bureau of Prisons training and then paying prison inmates to write computer programs for the U.S. Department of Agriculture.

In the process, some convicts learned to crack Internal Revenue Service (IRS) computer codes.They filed bogus tax returns and then received large tax refunds while serving penitentiary sentences, Ribicoff said last week in his Computer Expo '79 keynote address here.

One convict received a $25,000 IRS refund while doing a stretch at Leavenworth federal penitentiary. He was caught and convicted of tax fraud, Ribicoff said. The IRS knows of many similar cases and is "deeply concerned" about the extent of tax fraud behind prison walls, he added.

Training in Wrong Area

Many of the inmate DPers are serving sentences for white-collar crimes such as counterfeiting and securities violations, the senator said. One convict-programmer has been arrested 25 times and convicted of 14 felonies; he is still in his early 30s.

"It was not my committee's intention to question the very valid principle of rehabilitation for prisoners. But a man with 25 arrests and 14 felony convictions might be better taught to be an auto mechanic or [learn about] some other worthwhile trade that would not require him to be involved in sensitive financial transactions for the federal government," Ribicoff said.

The convicts write software to support Agriculture's soil bank, loan, emergency aid and Commodity Credit Corp. payments, he explained. The payments are worth hundreds of millions of dollars annually.

"Many other people — not just prisoners — have figured out the IRS computer code," Ribicoff continued. "Violators simply file totally fictitious returns, and the IRS sends them refund checks," he added.

For example, an ex-IRS employee beat the tax bureau for $650,000 before he was caught. "The man believed that 'If you can't be good, be colorful.'

"At the time of his capture, he owned an $84,000 home paid for in cash, four Jaguar automobiles, one Ferrari, a Mercedes-Benz and his own airplane," Ribicoff said. "He and his wife thought nothing of spending $500 for a single bottle of cognac."

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But Conditions Set

Safeway MTM Upheld

By Marcy Rosenberg
CW Staff

RICHMOND, Calif. — A labor arbitrator has given Safeway Stores, Inc. a conditional go-ahead to continue using the controversial computer-based productivity measurement system that triggered an 18-week strike late last year by union workers at its distribution center here.

Some 250 order selectors at the warehouse here are affected by the so-called Method Time Measurement (MTM) system, but Teamsters Union Local 315 believes it is only a matter of time before the MTM program is extended to other workers, according to Loren Thompson, Local 315 secretary-treasurer.

Order selectors went on strike to eliminate the system, claiming it increased their workload 50% to 100% and resulted in unfair disciplinary action for poor productivity [CW, Nov. 13]. Safeway said it implemented the MTM program at Richmond because productivity there was the lowest of its domestic warehouses.

The terms of the strike settlement called for members of Local 315 and Safeway to appoint a study group to decide whether the MTM program was reasonable. Failing that, the union was given the option to bring the matter to arbitration [CW, Dec. 4].

Conditions for Use

While the arbitrator ruled the MTM sytem — which assigns workers maximum times to fill orders — an acceptable way to measure work performance, he did impose conditions for its use.

First, Safeway must provide workers with a detailed orientation on how the system operates and applies to them. In addition, the supermarket chain is required to give employees up to 12 weeks to meet the time standards before suspending them and another four weeks once a five-day suspension is over before firing them.

Also, the two women and 10 men fired for failing to meet MTM production standards since the system was implemented in April 1977 were allowed to return to work.

Even so, "union members resent the decision," Thompson stated. They maintain "it is not humanly possible to meet and sustain the level of production" MTM demands.

Further, Safeway has given every indication it will extend the program to other sections of the distribution center, Thompson noted, including the 150-employee produce warehouse as well as some 40 forklift operators that load cartons pulled by the order selectors onto trucks for delivery.

For example, "Safeway is beginning to reduce the number of forklift operators in proportion to the number of order selectors," he said. "If management then doesn't get the production it wants from the forklift operators, that might create the need for a formal measurement program like MTM."

Safeway would neither confirm nor deny plans to expand use of the MTM program at Richmond. That "would depend on what the conditions and needs were at the various locations," a company spokesman said, adding MTM "might not be applicable in all cases."

Other disagreements center around the time elements involved in the stipulated revision of disciplinary procedures. The arbitrator's ruling requires Safeway to allow 12 weeks to elapse before suspending workers, during which time five verbal counselings and then a written warning must be issued. Before the strike, an order selector could be fired the third time he failed to meet a full day's quota.

Thompson noted, however, that management supervisors currently have been monitoring daily performance and that one man was given five verbal counselings in five consecutive days.

'Shove It In Their Ear'

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — Rep. Jack Brooks (D-Texas), chairman of the House Government Operations Committee, said recently he is not worried that some computer vendors might stop selling to the federal government because of its recent adoption of a controversial I/O standard.

"I would tell [those firms] to shove it in their ear," said Brooks, author of the 1965 law that established the basic guidelines for government DP acquisition and use. The congressman told a recent meeting of the computer & Communications Industry Association (CCIA) that there are plenty of suppliers on which the government could fall back.

"I would like to see them try," Brooks said of companies that might threaten to boycott the government DP market. There are ways to bring reluctant suppliers into line, he suggested, and the suppliers are "just as vulnerable to a bitter, mean, cutthroat broadside attack as anyone else."

Acknowledging his remarks were somewhat facetious, Brooks said on the serious side that he is not in awe of companies doing billions of dollars worth of business a year and has no respect for any firm that would not sell the government technology that was developed with

(Continued on Page 12)

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DDP Advised for Firms Whose Remote Sites Use 80% of the Data Processed

By Brad Schultz
CW Staff

NEW YORK — As a rule of thumb, if remote facilities consume more than 80% of the data processed by a user while less than 20% meets central site demands, the user should probably implement distributed data processing (DDP).

This so-called "80/20 rule" was endorsed by all the panelists who appeared at a DDP session at the Computer Expo '79 Mid-Atlantic Conference here recently. Two panelists conceded, however, that the sensitive nature of the data processed — and hence the issue of who controls the data base — might invalidate the rule.

Top management may forbid a decentralization of data base control to avoid risking unauthorized access to proprietary and other types of confidential records, Jerry Iverson of Four-Phase Systems, Inc. told the audience.

The 80/20 rule might also be waived if DDP would entail laborious and expensive "browsing" through the distributed data bases by the central facility, according to Felix Kaufman, of the consulting firm Coopers and Lybrand and moderator of the session. Hence, DDP might be unwarranted if the data demanded by remote facilities is also crucial to central operations.

Devil's Advocate

Kaufman occasionally played devil's advocate as the six other panelists, all representing vendors of DDP products and services, made DDP seem inevitable for multisite systems users.

Kaufman asked marketing executives from Data General Corp., Hewlett-Packard Co., Pertec Computer Corp., Mohawk Data Sciences Corp., Cummins-Allison Corp. and Four-Phase Systems whether recent price slashes for popular mainframe models offset the purported advantages of distributed minicomputer networks compared with mainframe-supported networks of terminals.

Mini vendors have also cut hardware prices — at a 30% per year clip, HP systems engineering manager Marc Hoff responded. Moreover, mini makers have improved products at an even faster pace, enhancing throughput and memory capacities.

Most users of small systems have reacted to these trends by buying as much performance as they can afford, Hoff maintained. For example, rather than fixing on the drop in memory costs, paying less and less for the same capacity, users prefer to upgrade from 20M to 30M bytes of mass storage for what had been the cost of 20M bytes.

As a result, terminal models that currently cost $200/mo will probably not decline in price, but their capabilities will be extended, Mohawk's product manager Norman Lange stated.

Tug of War

Nevertheless, Kaufman indicated that a "tug of war" exists between mainframers and mini vendors for the multisite customer, which complicates his planning for systems growth.

A user that has linked a central-site mainframe to a network of remote minis is probably moved to distribute its processing further as mainframes deliver more performance for the purchase dollar, Hoff contended.

The user is likely to upgrade its central facility, driving up the demand of remote nodes for data to process and hence the demand for small systems to do the remote processing, he explained.

Kaufman described the phenomenon as "an endless pipeline of information." The other panelists agreed with this description of the mainframers' impact on user acceptance of DDP; Mohawk's Lange termed mainframe developments "a shot in the arm" for DDP.

Demand for Esoterica

DG's Bob Kiburz, however, said vendors "get silly about hardware price drops"; software is far more important to the potential DDP user because the user typically lacks technical expertise at the remote level and thus demands high-level languages and esoteric applications packages to make CPU and communications functions as transparent as possible.

Brooks Defends I/O Standard

(Continued from Page 11)

government funds and contracts.

The I/O channel interface standard, adopted last month as a mandatory federal standard [CW, Feb. 26], was the subject of hearings at the National Bureau of Standards (NBS) last August at which several computer firms maintained the standard would hinder their government business. At that time, Honeywell, Inc. said the proposed standard would force it completely out of the government marketplace.

'Clear Signal'

Brooks said he hopes no company feels it must take that extreme action. The standard was adopted because "the computer industry failed to adopt a needed standard in a timely manner.

"NBS' decision to forego its reliance on the private sector and promulgate its own standard was, therefore, not only proper, but should be considered a clear signal to the industry that should it fail to develop other proper standards on a timely basis, the government, in the interest of all taxpayers, will proceed to adopt its own standards," he warned.

"The government, as a major user of DP resources, has a responsibility to the taxpayers to acquire and use these resources in an efficient and economical manner," Brooks said. In carrying out its standards-making responsibilities under the Brooks Act, NBS "Has followed a policy of relying on the private sector to develop standards."

And, Brooks said, he favors that policy "provided that the government has substantial input in the standards-making process and that standards will in fact be developed to meet the government's needs on a timely basis."

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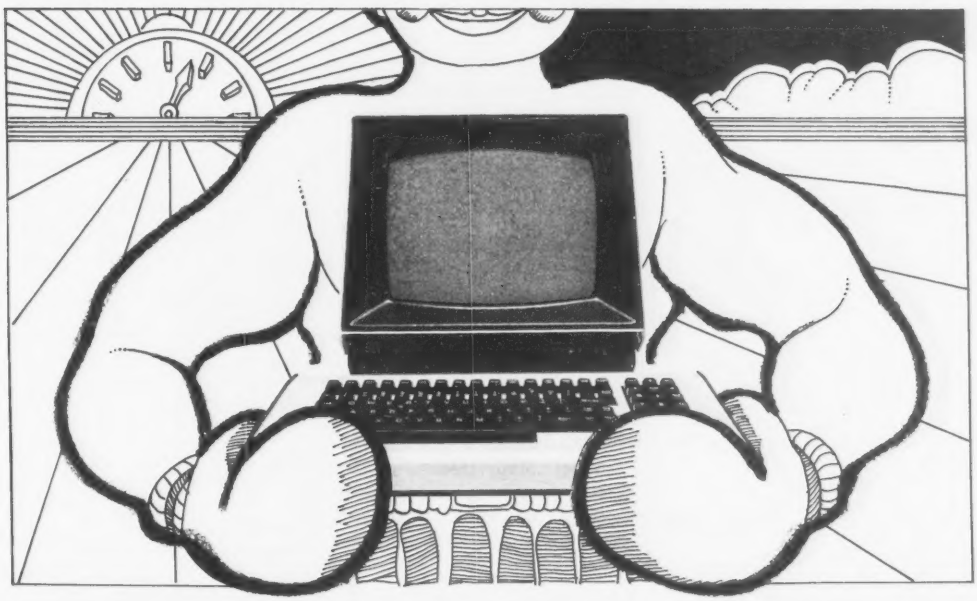

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DDP Systems: One Thing in Common

By Ronald A. Frank
CW Staff

WASHINGTON, D.C. — Distributed data processing (DDP) systems can take a variety of forms, but the key element of such systems is that application steps are spread over multiple processors, according to Neil Katz, systems analyst at CRC Systems, Inc. in Vienna, Va.

Speaking at a session on DDP concepts at the Federal DP Expo here last week, Katz described a typical distributed system as having any or all of three functions distributed — network processing, information processing and data bases.

Four Types

According to Katz, DDP systems tend to fall into four main types. The first he called application-based; the second he described as the structure type, the third is vendor-supplied; and the fourth is characterized by component subsystems.

These categories were developed as part of a research project of CRC Systems aimed at creating a taxonomy of DDP systems, he said.

The application types are usually composed of user-developed software and information data bases using vendor-provided hardware and software. The vendor software includes an operating system, telecommunications access method and other components, he said.

The structure type defines the distributed system as being either hierarchical or horizontal in design. A typical hierarchical system would be a classic IBM host with attached terminal. An example of a horizontal system would be a Digital Equipment Corp. Decnet system using multiple processors, he said.

A third structure combines hierarchical and horizontal elements and would be classified as a hybrid distributed DP system.

Vendor-provided DDP systems can be configured either as turnkey systems or set up with user-developed components.

Early DDP systems often had multiple CPUs closely linked and working together. An example was the IBM multiprocessing host configurations, according to Katz. DDP also developed from systems of multiple intelligent terminals in which each terminal undertook a portion of the processing. A third type of early system developed with the off-loading of mainframes to small processors such as communications front ends, Katz explained.

Reasons for adopting DDP include improved adaptability and reliability, better response times, reduced communications costs, resource sharing and less dependence on the corporate DP department, Katz told attendees.

IBM Balks at Request For Still More Papers

By Connie Winkler
CW Staff

NEW YORK — IBM has moved to quash a subpoena served on Chairman Frank T. Cary in the government's antitrust suit against the firm, arguing it would involve turning over more than five billion pages of documents, require almost 62,000 man-years of effort and cost the company "well in excess of $1 billion."

The charges came in an affidavit filed by Thomas D. Barr, IBM's lead attorney in the U.S. vs. IBM case being heard in federal district court here.

"In the present context, where Mr. Cary is expected to testify within weeks, it is obvious that the draftsman of the Cary subpoena either intended that it not be complied with or that Mr. Cary not be able to testify at any time in the foreseeable future," Barr said in the affidavit.

Cary's deposition was originally set for April 9, but in light of these developments it may be postponed. The government argues it needs the long list of documents in order to cross-examine Cary, who was closely involved in many of the issues of the case.

Robert J. Staal, who heads the government team, says he's willing to negotiate the documents, but IBM has refused to do so.

Latest Move

The quash motion is the latest move in what appears to be a stand by IBM to refuse to hand over any more documents. A similar position was taken by the computer manufacturer in response to the government's request for additional discovery of documents so it could begin formulating relief proposals in the event IBM is found to be a monopoly.

Staal sees a distinction between the two requests because the relief question would not come until the end of the case.

In IBM's response to the relief requests, IBM and Barr said these requests are attempts to delay the trial and could bring it to a halt for the lifetimes of everyone now involved.

Yet a third similar document question involves upcoming witness Robert B. Dunlop, IBM vice-president of manufacturing. In relation to document requests for that witness, IBM counsel Alan J. Hruska wrote to Judge David N. Edelstein:

"The obvious villain ... insofar as scheduling is now concerned is plaintiff's mid-trial dsicovery program. It has now exceeded exponentially anything it was originally represented to be and anything this court originally granted. It should be stopped for that reason, as well as for the inherent unfairness it inflicts."

The government notified Cary Feb. 7 of the deposition and requested an eight-page list of documents, including everything from papers involved in the preparation of his testimony in all IBM litigation to all documents relating to meetings Cary attended since Jan. 1, 1974 to documents under Cary's control relating to almost every issue in the case.

IBM has experienced similar document requests with the past eight to 10 witnesses and the document production has been negotiated and compromises have been reached, the government pointed out. It is only recently that IBM has refused to negotiate, Staal said.

Stressing that the Justice Department is asking only four witness-related documents in all these instances, Staal said that in Cary's case, the subpoena is extensive because Barr and Hruska have said Cary's written direct testimony will be 400 to 500 pages and he will address all the issues in the trial, which has been running four years.

So far the longest narrative testimony in the case has been just over 100 pages and that IBM witness, Cuthbert C. Hurd, was on the stand one month, in addition to the deposition.

Also, Staal noted, IBM has recently been presenting information after January 1974 — the date when the government's discovery was cut off. Staal said he would have agreed to withdraw the Cary subpoena had IBM agreed to confine Cary's testimony to the period prior to January 1974.

The government's request does concentrate on papers after January 1974. How this will be resolved is now up to Edelstein.

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Higher Maintenance Costs, Fewer Service Personnel Forecast for '80s Users

By Marcy Rosenberg
CW Staff

PALO ALTO, Calif. — Fueled by a growing installed base of information processing equipment and the proliferation of distributed data processing (DDP), user expenditures for DP equipment maintenance services will more than double in the next five years.

Meeting increased maintenance requirements by traditional vendor field methods will be difficult, however, as an already short supply of field service personnel continues to dwindle, according to a study by Input, an international consulting firm for the information processing industry.

Based on interviews with 150 DP users and 50 equipment vendors about maintenance requirements, Input forecast that users will spend about $10 billion by 1983 for maintenance of DP hardware other than office or common carrier-supplied communications equipment. This represents a 15% average annual increase in constant dollars from 1978 expenditures of $4.8 billion, the study said.

Costs Propelled Upward

Input also noted that wider use of DDP and of small business systems will propel maintenance costs higher than the dollar value of the installed DP equipment base, which is projected to grow about 11% to 12% per year from a current $70 billion.

Small business systems, which are now making up an increasing percentage of the installed equipment base, cost more to maintain than larger systems, according to Michael P. Burwen, Input's vice-president. Annual maintenance contracts for small systems run "about 12% to 15% of the purchase price, compared with between 4% and 7% per year for an IBM mainframe," he said.

DDP also boosts maintenance cost, Burwen noted, because it is more expensive to service equipment in remote locations.

To meet greater maintenance demands by traditional on-site repair methods, most vendors surveyed said they would have to double the number of field service personnel over the 1978-1983 forecast period for an average yearly increase of 15%.

Input, however, predicts these companies will face a shortfall of qualified people in the next two or three years, limiting field staff growth to a maximum 11% average annual increase.

Though the supply pinch is expected to peak in 1980-1981, Burwen noted that needs for field service personnel will slacken after 1983.

Changing Requirements

In the long term, new generations of information processing equipment "will change the overall requirements for field service," he said. "Systems will be more reliable and easier for users to maintain on their own."

Equipment will be designed so that users can isolate faults at the board or unit level through remote diagnostics, relegating only component-level repair to the factory or to centralized repair facilities, the study predicted. System repair may reach a point where "you may just slide a board in and out or unclip a module and slip in a new one," according to Burwen.

In addition, the average mean time between failure will increase on future equipment, reducing the average installation's maintenance demands.

For the present, however, "the most pressing problem facing field service organizations . . . is finding, hiring, training and retaining qualified field engineers," the study maintained.

One of the reasons finding personnel is a problem is that traditional sources for trained technicians, such as the military, have dried up and not been replaced.

As for new hires, the average attrition rate in field engineering is 50%, largely because of "inept first-line management," Input claimed.

'Second-Class Citizens'

Generally, management views field engineers as "second-class citizens" compared with programmers and engineers, and it therefore fails to provide adequate incentives, set performance standards or offer satisfactory training for field service staffs, Input said.

Incentive awards usually resemble marketing commissions, but are often small and based on subjective judgments, the study found.

Vendors reported that field maintenance personnel spend 20% of their time on repeat and "no fault found" service calls, but few set up programs to minimize unnecessary activities.

Also lacking are adequate vendor training programs for field service personnel. Most programs fail to keep employees up to date on the state of the art and, as a result, tend to obsolete long-time staff members.

One area neglected by vendor training programs is system software maintenance. Software maintenance will fall more in the domain of field service as DDP fosters a broader geographic dispersion of equipment, Input said.

Reasons for Reluctance

In fact, most field service executives interviewed said they were reluctant to assume software maintenance responsibility for a number of reasons:

- People trained in software can find better job opportunities as programmers.
- Software maintenance personnel will command programmer salaries that today exceed those paid to field engineers.
- Already overburdened by hardware maintenance responsibilities, field service organizations would be hard-pressed to add software to the workload.

To prepare for future software maintenance needs, Input recommended that vendors establish training programs and develop corporate policies to support integrated software/hardware capability in the field.

Entitled "Maintenance Requirements for the Information Processing Industry," the study is available for $9,000 from Input, 2471 E. Bayshore Road, Palo Alto, Calif. 94303.

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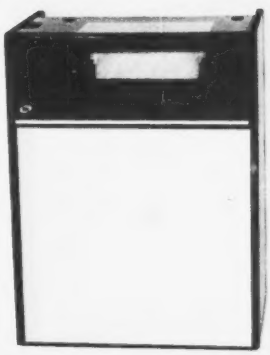

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Would Extend Hand-Cued Speech

Micro in a Pocket, Glasses to Help Deaf 'Hear'

By Jay Woodruff
CW Staff

RESEARCH TRIANGLE PARK, N.C. — Deaf persons can go through life at an educational disadvantage because even an expert lip reader can understand only one word in three. What's more, a person deaf from birth never gets the opportunity to practice his language by hearing it many hours a day like normal children do.

But the deaf may soon understand the spoken word as well as those who can hear it through use of a device that incorporates a battery-operated microcomputer and a pair of normal looking eyeglasses.

The size of a cigarette pack, the microcomputer will fit into a pocket. It will drive an LED symbol display built into the eyeglasses, then project on the wearer's lenses the information needed to fill in those parts of speech that remain ambiguous to a lip reader, according to Robert Beadles, one of the developers.

The computerized speech recognition system analyzes and displays only those sounds that cannot be distinguished by the deaf and flashes the symbols on the eyeglasses of the wearer, he explained.

Beadles, who claimed the display would not be obvious to anyone but the lens wearer, was motivated to develop the hearing aid by the desire to communicate with his deaf daughter.

But all this is still about three years away, he admitted, and development work is still under way on a Data General Corp. Nova minicomputer.

Hand-Cued Speech

The best communication system now available to the deaf is hand-cued speech. But the usefulness of this form of speech is somewhat limited because it is not universally understood by both speakers and the deaf, Beadles said.

Created in 1966 by Dr. Orin Cornett of Gallaudet College in Washington, D.C., hand-cued speech looks a lot like sign language to the uninitiated. However, it is fundamentally different.

Sign language was brought from France and is the grammatical equivalent of spoken French. Cued speech is a series of hand cues that "fill in the blanks" created by the visual ambiguity of certain vowels and consonants in English.

While talking, a speaker might say the word "singing"; the "ng" may not be clear to the lip reader. But he could put together the complete word by combining the lip movements and the hand cues for "ng," Beadles explained.

As Beadles and Cornett started to collaborate in 1971, they studied ways cued speech could be adapted to a computer. They were aware that computerized speech recognition cannot yet tell the difference between some sounds, such as "m," "n" and "ng," when used in certain words.

"Fortunately, those same sound patterns are easily recognizable by a lip reader, while such sounds as unvoiced fricatives, which are high frequency sounds that look the same to a lip reader, are sounds the computer easily recognizes," Beadles said.

One Pattern Isolated

Of the 60 or so speech patterns used in English, the researchers were able to isolate one that could give trained deaf persons enough clues to understand speech completely.

The LED symbol used by researchers at the Center for Technology Applications at the Research Triangle Institute and at Gallaudet College for display on the deaf person's eyeglasses is an adaptation of the "head-up" display used by fighter pilots to show critical instrument information on the windshield so they don't have to look away from the window, Beadles explained.

In the eyeglasses, as in the plane, the display appears to float in space. The deaf person can concentrate on lip movements while noting the speech cue signals that show up in four locations around the speakers' face.

Interpretation depends on the location of the symbols in the four-quadrant display as well as the shape of the symbol.

To illustrate an instance where the microcomputer aids "removal of consonant and vowel ambiguity," Beadles used the words "fee" and "see." The system can determine the "ee" sound of the two words, but not the fricatives "f" and "s."

It displays the symbol denoting the "ee" sound on the eyeglass lenses in a particular quadrant. The lip reader cannot tell the "ee" sound, but easily understands whether the lips are forming "f" or "s" sounds.

Putting together the lip reading and display information, the deaf person knows whether the speaker has said "fee" or "see."

To date, the system has been successfully tested by Beadles, Cornett and Dr. James Brown at Research Triangle Institute with deaf adults and children trained in cued speech.

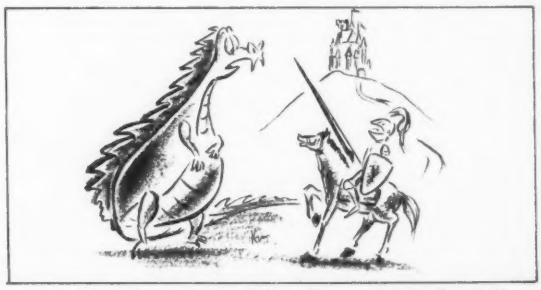
The relative simplicity of core and program requirements will make it possible to put the system onto a microcomputer, Beadles added.

The microcomputer will use no more than 100 mW, including the voltage necessary to drive the LEDs. It will process in excess of one million instructions per second and have a program memory of 16K bytes and approximately 4K bytes of data memory.

Ordinary dry cell batteries appear to work best, even with their short life span of a day or two, because they have a higher voltage output than rechargeable or alkaline batteries, according to Beadles.

In the third year of the development and testing program, a number of wearable units will be put into the field as a test of how much value they have as an aid to the deaf.

Most of the funding for the original project was provided by the National Institutes of Health, and researchers are "actively pursuing funding for the three-year project," Beadles said.



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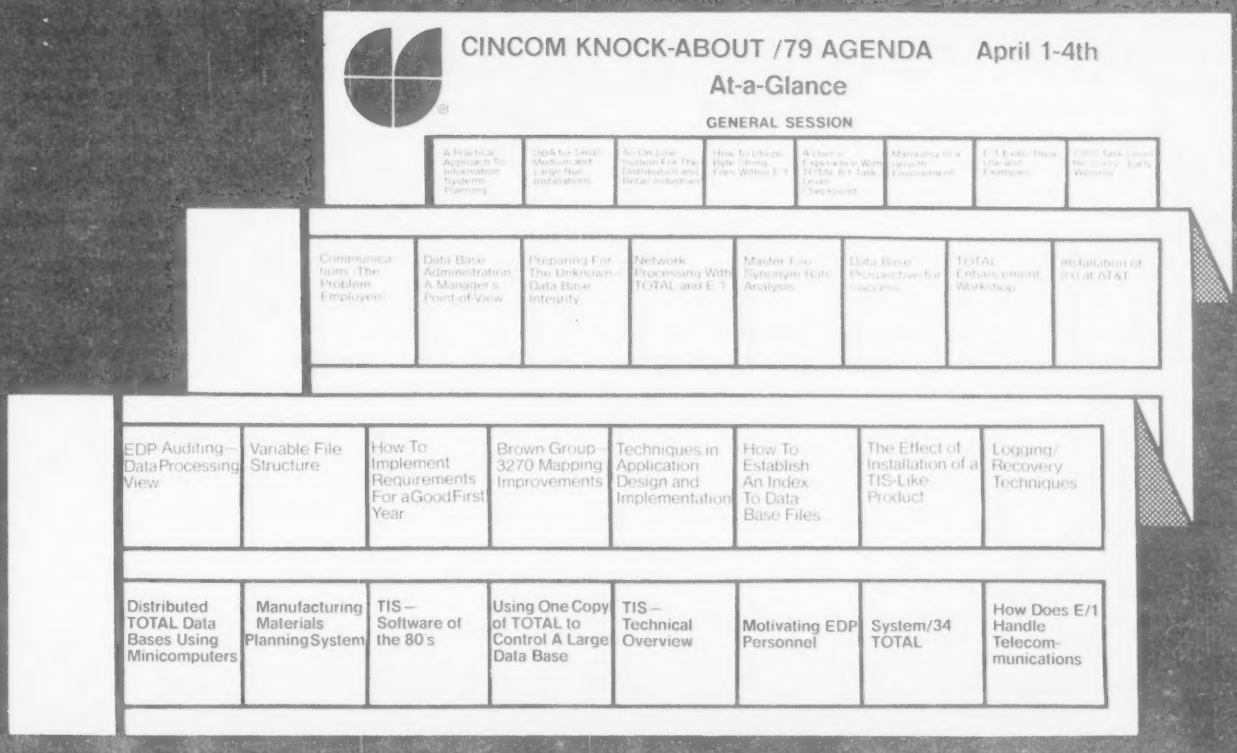
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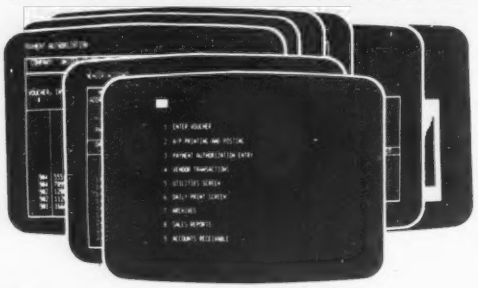

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U.S. Coast Guard Averts Collisions, Groundings With Help of Minis, CRTs

By Jay Woodruff
CW Staff

NEW ORLEANS — Collisions and groundings at this and other U.S. coastal waterways prompted the installation of a Coast Guard-run computer-assisted Vessel Traffic Service (VTS). Although angry pilots here have tried to shut it down through legal means, more of them appear to be using the voluntary system now than last year.

VTS was started when Congress passed the Ports and Waterways Act of 1972, charging the Coast Guard with the responsibility of eliminating waterway accidents.

The New Orleans VTS covers more than 300 miles of waterway from Baton Rouge, La., through the mouth of the Mississippi River, including a man-made gulf outlet from the Gulf of Mexico to the New Orleans harbor.

In the harbor area, the Coast Guard plans to install a closed-circuit television system to monitor harbor activity and has considered the installation of some form of radar tracking for certain sections of the river.

Radio Communications

The $4 million VTS installation, which is based in a building overlooking the New Orleans harbor, includes radio communication stations at four points along the river. It is nearly identical to a Federal Aeronautics Administration (FAA) Air Route Traffic Surveillance II (Arts) air control program for small to medium-size airports, except that VTS here does not use radar to track vessels.

Instead, in what is called a synthetic information system, river pilots periodically radio in their positions, headings and speeds. Between reports, the system estimates each vessel's course, according to Bruce Bogert, a Burroughs Corp. field service engineer.

The New Orleans Coast Guard operation uses two Computer Automation, Inc. LSI-2 minicomputers, one with 32K bytes of memory for running waterway ship positions on Burroughs SA-9030 radar CRTs, and one with 40K bytes of memory for collecting and handling information on the 300 or so ships plying the waterway at any one time, Bogert said.

One of the eight CRTs handles all telecommunications input and has an attached printer, he added.

The waterway system is divided into four sectors, each with its own radio frequency. At checkpoints along the way, pilots are required to report whether they are speeding up or slowing down and other information that might be useful, such as the presence of obstructions in the river or reduced visibility.

Whenever a boat enters the system under VTS jurisdiction, its pilot or captain reports its type — tanker, tugboat with barges or freighter — its position, destination, route, the general nature of the cargo carried, estimated time of arrival, maximum draft, boat length and beam and special handling instructions, according to Lt. Cmdr. Richard A. Bundy, executive officer of the U.S. Coast Guard VTS of New Orleans.

A projection program at the VTS center automatically calculates where the ship is going until it reports in again. The ship's location on the screen, is marked by a designator with letters and numbers alongside it. Every 30 seconds, the ship's position is updated.

Three Objections

An estimated 65% to 70% of the New Orleans vessel traffic participates in the voluntary VTS program. If the program were mandatory as it is for a few types of boats, vessels would be required to participate when they entered the system's boundaries, according to Bundy. However, resistance to VTS, which began operation in October 1977, has prevented its organizers from calling it a complete success. Still, they are optimistic.

Bundy said adverse reaction to the service is based on three things:

- Pilots lost three of their 15 VHF radio communication frequencies, which they said were crowded already, to the Coast Guard program.
- The three radio frequencies used by VTS are to be monitored by the pilots, and they complained "it was difficult enough to monitor two," Bundy said.
- Pilots felt they had no input into VTS planning sessions.

Although one new radio frequency has been restored to the pilots and the other two will eventually be added, an ad hoc committee of riverboat pilots was angry enough to take its grievances to court.

After losing its fight to halt the service in a lower court, the committee brought an appeal to the Fifth Circuit Court of Appeals here five months ago and lost. Since then, the committee has talked about taking the case to the Supreme Court, but Bundy indicated that he did not think it would go that far.

Those who do not participate are not above subverting the system, according to Bundy, who claimed the group that took VTS to court is the same group that occasionally calls in fictitious vessels for the Coast Guard to track and display on its screens. While enough reports come in to enable VTS to eventually determine whether such ships actually exist, they are often displayed as the real thing, according to Bogert.

Ships that do not report in are not invisible to VTS, however. In the harbor area, a ship that has not reported in can be seen either from the Coast Guard operation overlooking the harbor or identified by monitoring one of the VHF channels pilots use.

But even if they can be identified, it is still a problem to track them on the waterways because VTS cannot tell exactly where the ships are headed. In the future, VTS may install a true radar system to get a more complete idea of ship movements, Bundy indicated.

Since, the VTS system was inaugurated here, vastly improved information has allowed the Coast Guard to register far more groundings and collisions than before. "Now if anything at all happens on this river, we know about it immediately," Bundy said.

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SOFTWARE INDUSTRY ASSOCIATION

With 22 Systems, Ghana Beset by Lack of DPers

By Joseph Hanlon
Special to CW

KUMASI, Ghana — Ghana is not effectively utilizing its computers because of a lack of trained people, according to Prof. F.K.A. Allotey, head of computer science at the University of Science and Technology (UST) here.

Both UST and the University of Ghana (UG) at Legon have new computer science courses. UST will graduate its first 17 computer scientists in September and UG its first crop next year. Both universities have diploma and certificate courses as well.

"It's not just having letters after your name, but using the computers efficiently," warned K.B.E. Quagrianie, secretary of Ghana's Data Processing Control Board. The board is refusing to permit the import of new computers until the present ones are used more efficiently.

Sitting in his office on the 11th floor of the state house overlooking the Gulf of Guinea, Quagrianie agreed with Allotey that more trained staff is the key to improving computer utilization. As in other developing countries, IBM and International Computers Ltd. (ICL) oversold, so users must catch up before more computers are bought, he contended.

Ghana has 22 computers, 16 IBM and 6 ICL.

"All over the world, having your own computer has more status than anything else. But managers and directors must understand the machine is a tool, not an end in itself," Quagrianie pointed out.

In a country where even IBM can't keep its air conditioning running, many problems bedevil computing. Irregular electricity and lack of supplies cause problems. But the biggest one is inflation — an annual 100% for the past two years — which has made the real value of salaries very low.

Government computer experts move to private industry. And both government and private industry staff are leaving the country in ever larger numbers, particularly for Nigeria and Liberia.

While it is not clear how many of the new graduates will remain in computing in Ghana, recent attempts to restructure the economy seem likely to make some difference.

Calendar

April 25-27, Washington, D.C. — **Wideband Communications Systems.** Contact: Continuing Engineering Education, George Washington University, Washington, D.C. 20052.

April 25-27, Washington, D.C. — **Structured Analysis and Design.** Contact: The Institute for Professional Education, Suite 303, 1515 N. Court House Road, Arlington, Va. 22201.

April 25-27, San Francisco — **Minicomputer Systems.** Contact: The Institute for Professional Education, Suite 303, 1515 N. Court House Road, Arlington, Va. 22201.

April 25-28, St. Louis — **1979 Annual Conference of the Association for Systems Management (ASM).** Contact: R.B. McCaffrey, ASM, 24587 Bagley Road, Cleveland, Ohio 44138.

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THE FORTUNATE 96.

Comments Sought by April 30

FTC Proposes: Let Insurance Applicant See File

By Marguerite Zientara
CW Staff

WASHINGTON, D.C. — The Federal Trade Commission (FTC) is seeking public comments on its recently proposed guidelines that would allow persons turned down for insurance policies to learn more about why they were rejected. Currently, such decisions often are based on computerized data exchanged among insurance companies and independent agencies.

The FTC guidelines seek to expand the information available to rejected insurance applicants to include data obtained from "any third-party sources . . . inspection bureaus or other types of consumer-reporting agencies, independent agents, independent paramedics or doctors, attending physicians and hospitals or clinics that have treated the applicant."

If adopted, the guidelines would not have the force of formal regulations, but would lay out FTC policy for enforcing federal credit law provisions governing what information rejected insurance applicants can rightfully obtain from insurers, according to an FTC spokesman.

Help for Consumers

The guidelines primarily attempt to pinpoint data exchanges that constitute "consumer reports" and therefore are subject to the Fair Credit Reporting Act (FCRA), which protects consumers against insurance rejections based on inaccurate information.

The FCRA requires that an applicant be told the name and address of the source of an underwriting report that led to an adverse decision on the consumer's application and whether the source furnishes similar reports on a regular basis.

The act also gives applicants the right to require the source to disclose the information reported and to correct inaccuracies.

According to the act a "consumer report" is "any written, oral or other communication . . . by a consumer-reporting agency bearing on a consumer's creditworthiness, credit standing, credit capacity, character, general reputation, personal characteristics or mode of living," which is used to determine eligibility for insurance.

"The term does not include . . . any report containing information solely as to the transaction or experiences between the consumer and the person making the report," the act stipulated. Thus, according to the FTC, when one insurance company communicates information on its own experiences with a consumer to another insurance company, the information does not constitute a consumer report and therefore need not be disclosed to an applicant.

"However," many insurance companies believe that *all* of the information they exchange on consumers is similarly covered by the exemption for transactions and experiences," the FTC proposal stated. In addressing the matter, the commission proposed two conditions necessary before the "transactions or experiences" clause may be invoked by an insurer.

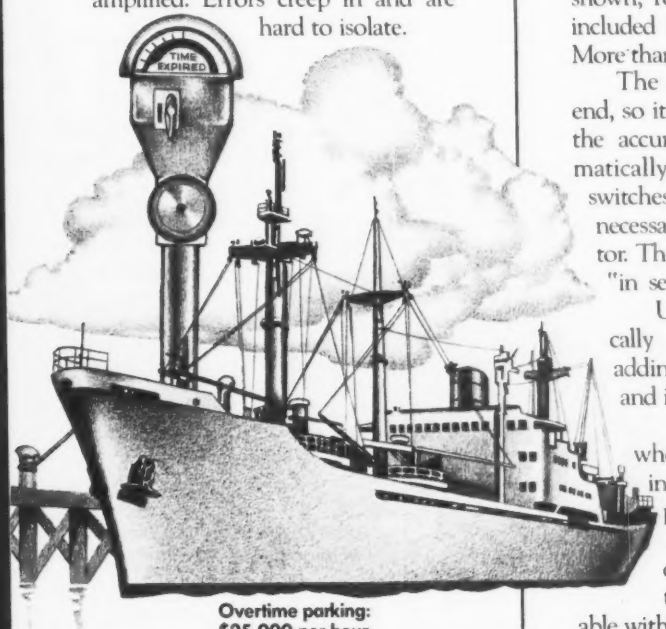
"First, the information exchanged must have been obtained through a direct contact between the consumer and the company making the report. Second, the information exchanged must not describe matters that predate or occur independently of the consumer's relationship with the person making the report, the proposed guidelines said.

Life insurance companies

(Continued on Page 22)

PROBLEM:

Transferring large amounts of data from one business machine to another—an everyday business need—can be complicated, slow and costly. Signals get converted and amplified. Errors creep in and are hard to isolate.



Overtime parking: $25,000 per hour.

Whole blocks of data are jeopardized. And retransmissions eat up valuable computer and line time.

Delays can have very expensive consequences. On the order of $1,000 per hour per circuit for time-sharing firms. Twenty-five times that for a company with a ship held in port by faulty documentation. Ulcers for a data processing manager transmitting month-end reports to the home office.

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DOD vs. Jovial: Will Revision Be Allowed?

Special to CW

FORT WORTH, Texas — A meeting of the Jovial User Group, tasked with finalizing a revision to the military standard definition of the Jovial J73 language, was presented with the startling possiblity that the effort might come to naught here Feb. 7.

Paul Cohen, representing the High-Order Language Working Group of the Department of Defense (DOD) Ada triservices languages effort, announced to the meeting that he had been sent to answer the question, "Should the Air Force be allowed to replace the existing J73 with this new one?"

The user group immediately formulated a policy statement supporting the language revision as a necessary and properly evolutionary modification of its predecessors. Air Force representatives at the meeting stated that they are taking the position that "the current definition is unacceptable as a standard," "the new language is an upgrade of an existing, acceptable language" and that "the Air Force will not tolerate J73 not being on the list."

Basis of Conflict

The conflict arose from DOD Instruction 5000.31, which states that only seven existing triservices programming languages are acceptable as interim languages, pending the availability of the common language Ada.

Jovial J73 is on the list (along with Fortran, Cobol, Jovial J3, CMS-2, SPL-1 and Tacpol), but the Air Force revision represents the first revision of one of the interim standard languages that is not upward-compatible.

The issue is expected to be settled at an upcoming DOD High-Order Language Working Group review meeting early this spring.

FTC Guidelines Propose Access to Files

(Continued from Page 21)

typically ask an applicant to list all the insurance companies to which he has applied and/or by which he has been rejected. Insurers frequently contact the companies cited by the applicant for information to complete their own investigations, the proposals noted.

Occasionally, an insurer "will even contact at random a company not listed by the applicant on the chance that the company considered a prior request" from the applicant, the proposal said. In addition, insurers frequently rely on investigative consumer reporting agencies "to provide information concerning the applicant's relationship with other insurers."

While a "significant" number of insurers will not disclose underwriting decisions and while many release only the names and addresses of information sources, the proposal noted that other companies are willing to exchange part or all of their underwriting files on applicants. "Copies of medical tests such as brain scans or electrocardiograms (EKGs) are often forwarded by one company to another," as well as information disclosed by the applicant on his application, the FTC said.

Need for New Rules

"The nature and scope of consumer injury caused by information exchanges between insurance companies is difficult to measure," the FTC found. "Consumers typically are not told the reason for the adverse decision and therefore have a difficult time discovering the cause of their problems and addressing complaints to appropriate state and federal agencies."

The commission also noted that "it appears that once erroneous information enters the insurance company network, it can remain indefinitely" since many companies fail to fulfill the FCRA requirement to purge their records of adverse information after seven years, mistakenly believing they are exempt.

Furthermore, in the absence of FCRA notification, indicating that information from another insurance company was involved in an adverse decision, the consumer is unaware that the possibly erroneous information exists and therefore cannot challenge or correct it.

The FTC staff noted that information on an applicant's character, reputation and social environment commonly provided to insurers by reporting agencies is "most susceptible to error" because it is often supplied by neighbors and fellow employees. Thus, it may reflect "only partial knowledge, personal dislike or even some form of social prejudice," the proposal stated.

Erroneous information, passed from insurance company to insurance company, may result in a snowballing effect with the applicant being turned down for insurance again and again without recourse, the proposal said.

While the guidelines would not have the force of formal regulations, the FTC expects the insurance industry to comply if the proposal is adopted by the commission, according to an FTC spokesman.

Aetna Gives Access

In the forefront of such privacy protection is Aetna Life & Casualty, the nation's fifth largest insurance company [CW, Jan. 15]. Aetna has widely publicized its recent policy to allow its 4.5 million policyholders and all rejected applicants to examine and, if necessary, correct information about them in company files.

While Aetna is following many of the recommendations of the Privacy Protection Study Commission created in 1974, industry observers noted that many competitors have stongly resisted the commission's privacy recommendations.

Nevertheless, more potent pressure soon may be exerted since the National Association of Insurance Commissioners' task force on privacy laws is currently drawing up a model privacy law, which insurance commissioners around the country could recommend to their state legislatures.

The deadline for public comments on the FTC proposal is April 30.

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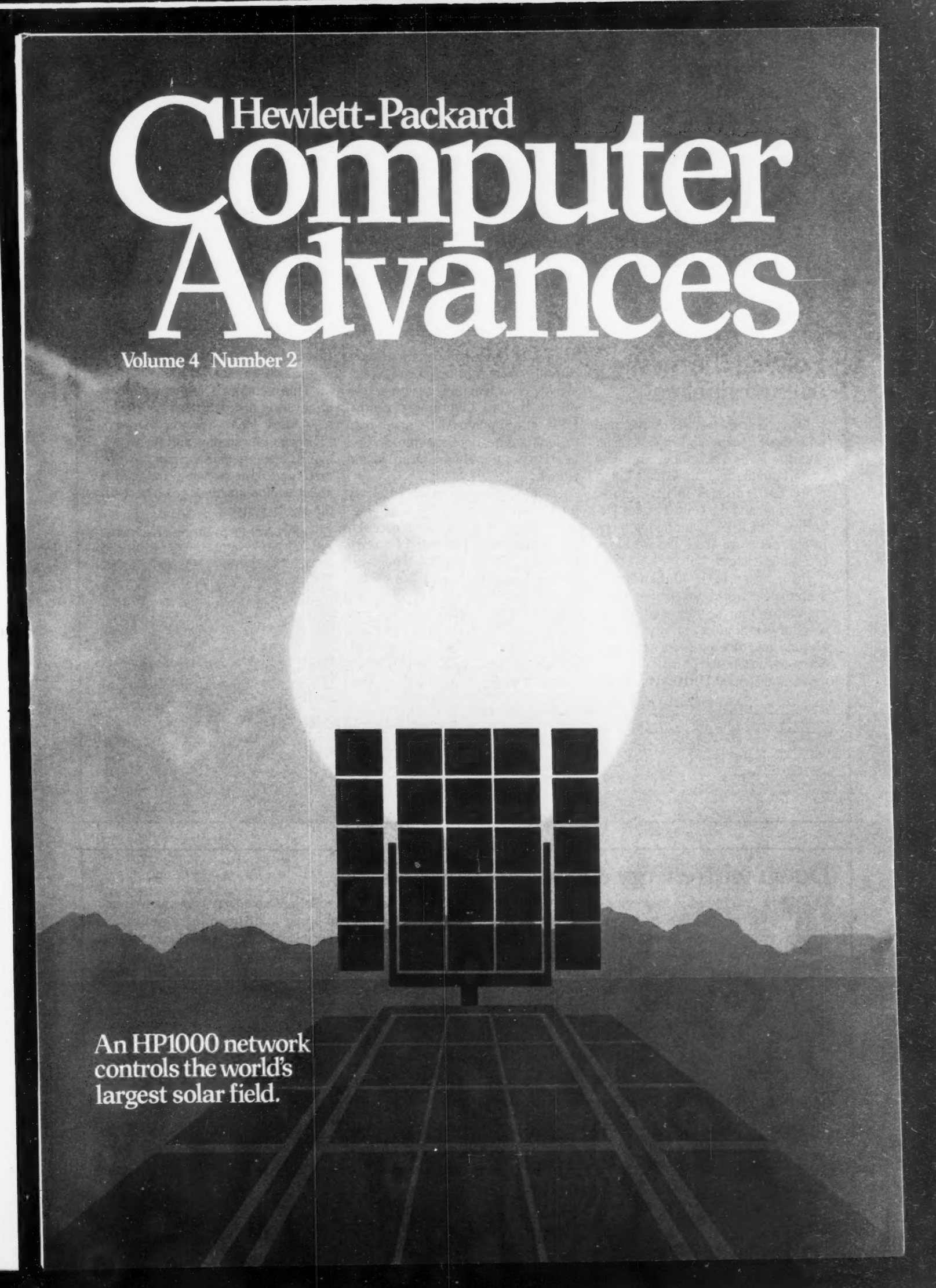
Computer Advances

Volume 4 Number 2



An HP1000 network controls the world's largest solar field.

Learning to live with the world we live in

Solving the mystery of earthquakes

Every year thousands of lives and millions of dollars are lost as a result of earthquakes. Yet, no one completely understands them. Lawrence Livermore Laboratories in Livermore, California, and the United States Department of Energy are taking steps to find out more about the workings of seismic energy.

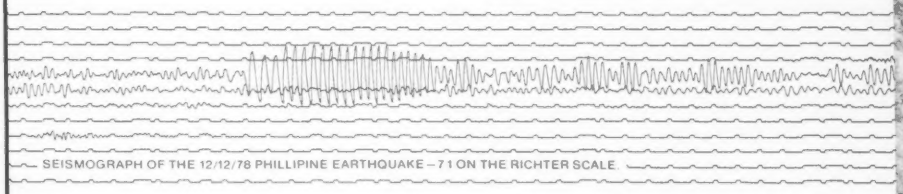
Utilizing an HP1000 distributed systems network, Livermore Labs maintains four seismic stations to monitor earthquake activity: two in Nevada and one each in Utah and Southern California.

An unattended HP1000 operates at each of the seismic stations, continually transmitting seismometer signals on a real-time basis via telephone line to Livermore's central HP1000 computer. All pertinent data including time, date, magnitude, and location of the event are recorded and stored.

Should scientists wish to study particular events or the way seismic energy is propogated through the earth's crust, Hewlett-Packard's IMAGE/QUERY data base management software lets them examine the seismic data base and list all events that meet their specified values and parameters. The University of California at Berkeley, the University of Nevada at Reno, and the U.S. Geological Survey constantly access Livermore Lab's data to further their earthquake studies.

"This monitoring system is capable of covering a broad dynamic range," says Marv Denny, project manager. "Through our studies and the meaningful, accurate data we can provide, more and more is being understood about what really does go on beneath the earth's surface."

Livermore Labs' HP1000 network collects seismic data from stations deep in inactive gold mines.



SEISMOGRAPH OF THE 12/12/78 PHILLIPINE EARTHQUAKE – 7.1 ON THE RICHTER SCALE.

Down with energy costs!

The cost of energy is continually rising. With a computerized energy management system, International Energy Conservation Systems, Inc. is helping managers of some 60 widely scattered buildings in the Atlanta and Washington, D.C. areas to save 15 to 50 percent of their energy costs.

At the heart of the system is an HP1000 computer—shared by all users and connected via telephone lines to each building's utility systems. The computer monitors energy use on a second-by-second basis. The system can select from 16 different tailor-made, energy-sensitive strategies and put the appropriate one into effect automatically and instantaneously for each building. Heating, ventilating, and air conditioning systems are regulated depending on ambient temperature, solar effects, relative humidity, and other changing parameters.

"Most customers have averaged about $2,000 a month savings on their bills, while some have saved more than $10,000 during some months," notes Richard Jackson, IECS secretary-treasurer. "System installations usually pay for themselves in three to 18 months." One IECS-controlled facility, Northside Hospital, claims savings of 19 percent in energy and over $100,000 in the first year. This installation paid for itself in less than four months.

Other successes: the Prado Office Park West Building has had an annual energy savings of 50 percent, while the all-electric Rutherford B. Hayes Building in Washington, D.C. has reduced its electrical consumption 25 percent per year with improved comfort levels.

Asarco works for its employees

Excessive exposure to heavy metals can be harmful to an employee's health. ASARCO Incorporated, a world leader in non-ferrous metal production, is using a Hewlett-Packard 1000 computer system to help maintain a quality working environment for its employees through an up-to-date biological and environmental monitoring program.

When employees begin working at Asarco, they have blood or urine samples taken. These samples are then analyzed by the lab with results entered into the HP1000's IMAGE data base. Periodic sampling will show any blood or urine changes due to occupational exposure to certain airborne substances. Based upon the analysis and evaluation of those samples, corrective measures can be suggested and/or implemented quickly.

Diffusion modeling of smokestack emissions is another important HP1000 application at Asarco. Determining the impact of stack emissions on the environment under varying temperatures, pressures, winds, and factory conditions is essential to maintaining clean air, yet can be extremely expensive. "Before purchasing our HP1000," says Rodwell B. Watson, senior statistician, "we had the diffusion models run on a contract basis. Today, we may be saving as much as $45,000 a year by doing it ourselves."

Harnessing the sun's power

With oil supplies rapidly diminishing, a practical alternative to fossil fuels must be found. Sandia Laboratories of Albuquerque, New Mexico, is studying the potential of solar energy and uses an HP1000 distributed processing network to operate the world's largest solar test facility.

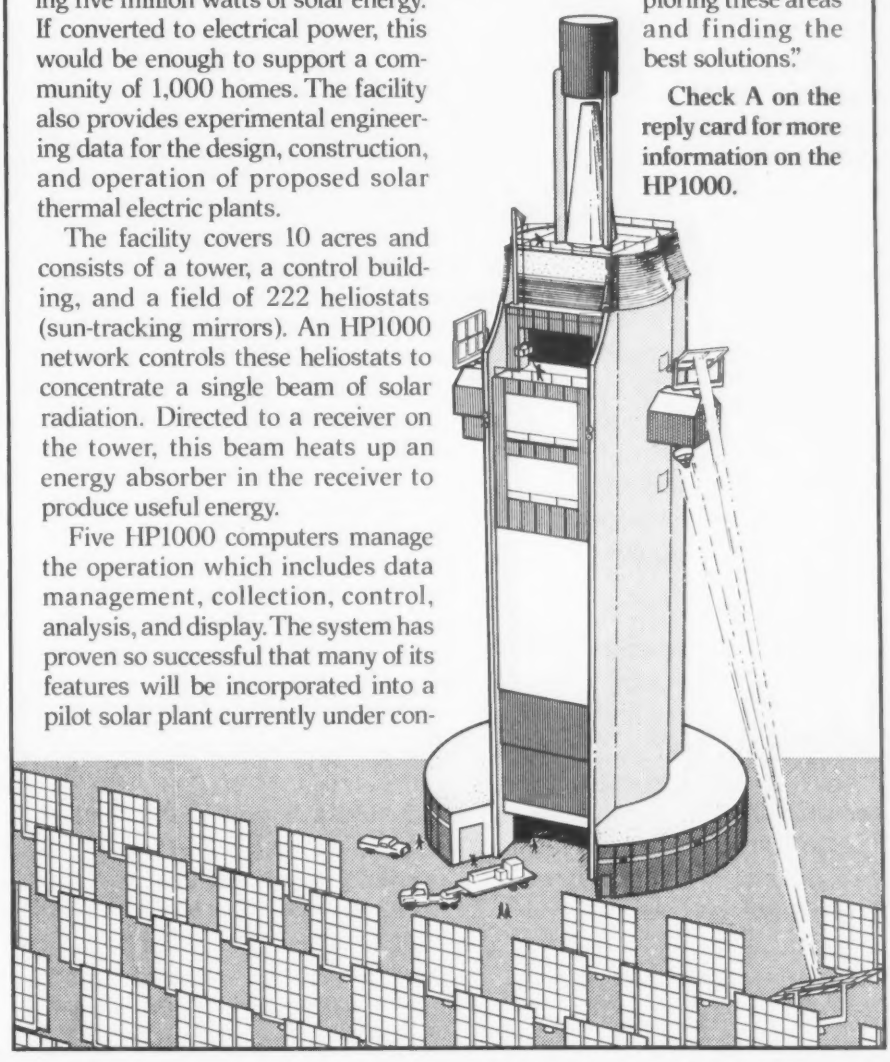
During a four-hour test period, Sandia's facility is capable of receiving five million watts of solar energy. If converted to electrical power, this would be enough to support a community of 1,000 homes. The facility also provides experimental engineering data for the design, construction, and operation of proposed solar thermal electric plants.

The facility covers 10 acres and consists of a tower, a control building, and a field of 222 heliostats (sun-tracking mirrors). An HP1000 network controls these heliostats to concentrate a single beam of solar radiation. Directed to a receiver on the tower, this beam heats up an energy absorber in the receiver to produce useful energy.

Five HP1000 computers manage the operation which includes data management, collection, control, analysis, and display. The system has proven so successful that many of its features will be incorporated into a pilot solar plant currently under construction near Barstow, California.

Dave Darsey, automated control system project leader, states, "Though the use of solar energy has many advantages, there are still problems and techniques to be worked out. The HP1000's excellent networking capabilities, sophisticated control, and data communications make it an excellent tool to assist us in exploring these areas and finding the best solutions."

Check A on the reply card for more information on the HP1000.



Draw your own conclusions

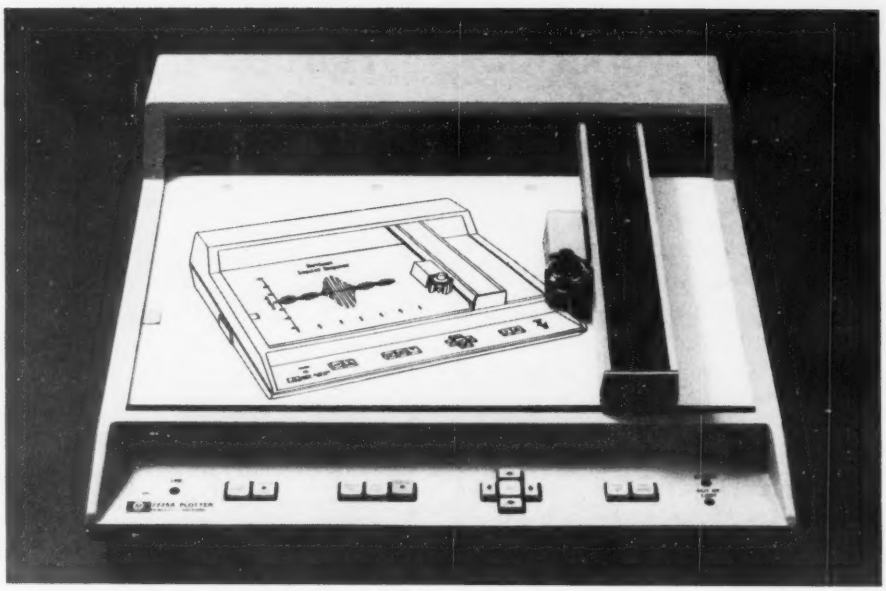
Scientific and business computation often generates volumes of tabular data. One problem is that in this form much of its value is hidden or lost. Charts and graphs bring meaning to this data. The new, compact, single-pen HP7225 plotter offers a high quality and reliable graphics solution—at a low price.

An important parameter in judging a plotter's performance is the quality of its output. Utilizing state-of-the-art linear stepper motors and microstepping techniques, the HP7225 draws virtually stepless lines at a resolution of 0.032mm on either A4 or 8½ x 11 inch paper. And the simplicity of the drawing mechanism—no pulleys, gears, or cables—helps the HP7225 achieve an extremely high level of reliability.

The plotter's modular construction is another advantage. The major portion of its electronic circuitry, including a microprocessor, resides on a single printed circuit board. Results: fewer parts, reduced power requirements, inherent reliability.

A plotter with personality

Requirements for a plotter vary considerably depending on a user's changing needs. To accommodate this in a flexible, yet economical way, the HP7225 uses removable "personality modules." This innovative system provides the appropriate interface, language, and graphics capability for a variety of computer systems, desktop computers, intelligent graphics terminals, and instrument systems. You can buy the plotting performance you need today. And, by simply purchasing and plugging in a different low-cost module, you can meet many additional interfacing and plotting requirements in the future.



The HP7225 graphics plotter: a self portrait

Three personality modules—microprocessor-based plug-in cards—are currently available, with more planned for the future. Each offers relative and absolute vector plotting, internal scaling, and pen up/down capabilities.

One module is a $150* binary language interface used for Hewlett-Packard desktop computers. For the OEM, a more flexible binary module was designed to offer varied interfaces and a remote front panel capability. It is available for $200.* The third module costs $750* and supports the HP-IB** interface, speaks HP-GL (Hewlett-Packard Graphics Language), has internal character sets and dashed lines, and is compatible with GRAPHICS/1000 software.

Sophistication at a low price

Because we have incorporated flexibility with state-of-the-art technology, the HP7225 is extremely easy to use. Full capability front panel, automatic reset, electrostatic paper hold-down, and easy-to-change high quality pens (in four colors) are just a few of the advanced features rarely found on a low-cost plotter.

For more information on the compact HP7225 graphics plotter, check B on the reply card. Prices start at $1850* (personality modules extra)—low enough to dedicate several plotters to your task needs. **For special OEM product and discount information, check C.**

*U.S. domestic prices.
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Capture day-to-day data

Effective management decisions must be based upon reliable, up-to-date information. Hewlett-Packard's new family of interactive data capture terminals is helping make data accuracy a reality.

Designed primarily for manufacturing companies, these low-cost, compact terminals can be tailored, through 60 combinations of modular options, to accommodate a wide range of tasks—from machine shop management to time data reporting. Furthermore, interactive computer control helps assure that data is accurately collected at its source. Seventeen user-definable prompting lights, 10 special function keys, and a 15-character LED display lead the operator through transactions one step at a time. Employees can input and retrieve data without prior computer experience or training.

An optional alphanumeric keyboard and/or display is also available. Each of the 26 alpha keys can serve special functions such as retrieval of the last order, invoice number, or quantity of parts in stock.

Read with mirrors

Source data comes in various forms: marked sense cards, punched cards, or industry Type III identity badges. Hewlett-Packard has developed a multi-function reader that combines a fiber optic read-head with mirrors. Not only can it read all three media, but dirty and crumpled punched cards can be read without error—an important advantage in a manufacturing environment. This innovation is available as an option on the HP3075 desktop terminal—well-suited for office applications—and the HP3076 wall-mounted version. A Type V identity badge reader is also available as an option.

Wall-mounted or desktop, our data capture terminals have an optional printer to document transactions.

More than a time clock

Accurate time reporting is essential to cost accounting functions. The wall-mounted HP3077 time-reporting terminal provides this—and more.

Serving as a time clock, with a large digital time display, the HP3077's innovative Type V badge reader can read badges both right side up and upside down. Prompting lights instruct employees when to enter their badge. Buzzers indicate correct/incorrect entry. And, a memory buffer enables badges to be read as fast as they are inserted.

The HP3077, as well as the HP3076 can improve security by controlling access to restricted areas. Electrical door locks are operated by a relay in the terminal's wall-mounted cradle. When a badge is entered, employee data and time of entry are sent to the computer. If acceptable, the door opens.

A choice of connections

These terminals also make it easy for the system programmer to select an appropriate data communications mode. A choice of point-to-point, multipoint, and multidrop is available by just setting a switch on the back of the terminal.

To find out more about HP's durable, low-cost data capture terminals, check D on the reply card. The HP3075 starts at $2090;* the HP3076 at $2475;* and the HP3077 at $2530.* OEM and quantity discounts are available.

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Academic-Industrial Union Ends in VAX Pascal

Special to CW

SEATTLE — In a unique blend of academic-industrial cooperation, the University of Washington and Digital Equipment Corp. have linked arms to produce a just-off-the-press Pascal language compiler for DEC's not-too-long-off-the-press VAX-11/-780 minicomputer.

The Pascal compiler, produced to a jointly developed specification, was built by computer science Prof. Hellmust Golde and a team of five part-time graduate students.

Working as research assistants, the students were given financial support by the University. Most derived master's thesis material from the project.

The compiler itself is a bootstrap of the Pascal compiler from the Control Data Corp. 6000 mainframe line. The task consisted of rehosting the compiler to a VAX and adding language enhancements.

The latter include provisions for identifiers of up to 15 characters; an OTHERWISE clause for the case statement; dynamic array parameters; an exponentiation operator; and INCLUDE verb; data presets; separate compilation; and double-precision real.

The project has taken about 14 months. "At times we all worked very hard and sacrificed many weekends," Golde siad. But, he added, "the project was a success."

The current status of the compiler is "prefield-test." Golde hopes the compiler will move to field test status — and an official availability announcement from DEC — in a very short time.

The compiler was the subject of a presentation by Golde at the Decus of Canada user group meeting in February. It will also be presented at a domestic Decus meeting this spring.

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MIT Loses ACM Crown In Contest

ST. LOUIS — Washington University of St. Louis defeated defending champion MIT in the Third Annual National Scholastic Programming Contest sponsored by the Association for Computing Machinery and Upsilon Pi Epsilon, the honorary computer science fraternity.

Trailing Washington University in the order in which they finished were Michigan State, Purdue, New York University and MIT.

The Washington University team was the only one of 21 competitors to correctly solve all four of the complex programming problems within the 6.5-hour time limit. Only the next six finishers correctly solved three of the problems.

The winning team members were seniors David Doty, a physics major from Orono, Maine; Steven Karasek, a computing science major from Omaha, Neb.; David Camp, a computer science major from Pine Lawn, Mi.; and sophomore Nathan Schroeder, a mathematics major from Clayton, Mi.

David G. Weible, supervisor of Academic User Services at Washington University's Computer Facilities, coached the team.

This year's contest problems involved the creation of programs that would convert arabic numerals in a text to Roman numerals, simulate a speedometer connected to an automobile transmission, print out decimal fractions to more decimal places than a computer normally would allow and simulate a board game which uses wooden pegs as playing pieces.

This is the second time in a year that Washington University students have won a national college and university competition. Last March a three-person team of mathematics students won the Putname Award in mathematics.

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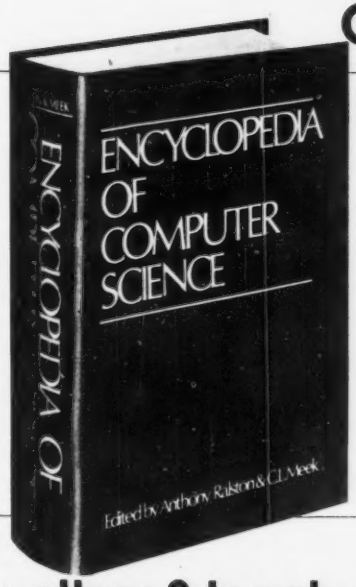

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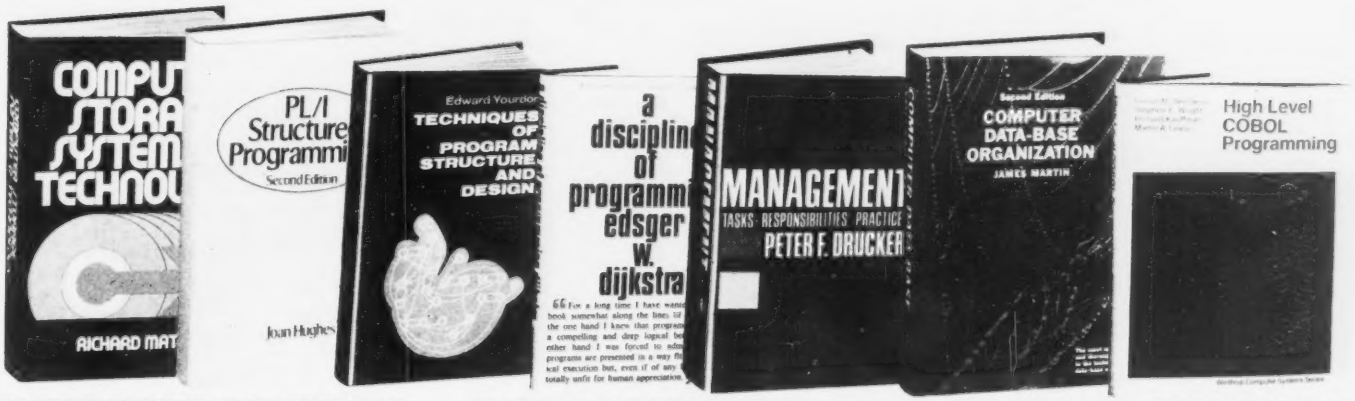

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Editorial

The Time Is Now

The time has come for a complete rewrite of the Communications Act of 1934, the law that established AT&T as a regulated monopoly for providing telephone services.

The bill introduced recently by Sen. Ernest F. Hollings (D-S.C.) seems to start in the right direction.

Thirty-five years have passed since the basic communications law was written. The entire scene is different today, and it calls for different solutions.

In 1934, the nation was still in the midst of the Depression. Telephone service was a fragmented and cutthroat business, dominated by AT&T.

The prime motive for the 1934 law was to make sure that telephone service could be provided to as many people as possible at the lowest possible rates. It seemed to be a market that was a "natural monopoly."

That concept has worked well. While the U.S. may not have the best telephone service in the world — a matter that can be debated — it certainly is one of the best, and the cost of basic telephone service is within the reach of almost everyone.

However, new techniques and technologies now permit better service than that offered by the phone company, particularly for business and data users. Competition in the market would be good for everyone except possibly AT&T, even though that can also be debated.

The Hollings approach [CW, March 19] seems to be the right one. Basically it would foster competition by allowing competitors in certain segments of the market and fostering their growth before permitting fully free competition.

The reason for these "halfway houses" for competition are obvious. If all restrictions were taken off the market in one fell swoop, AT&T would have the market power to run its fledgling competitors out of business.

By moving gradually, the industry can be brought to a competitive state without a great deal of dislocation and confusion.

Users and vendors alike should be able to support this gradual approach and should press Congress to move toward a new law as quickly as is feasible.

Nagging Questions

News stories often raise questions that can't be answered in the context of straight reporting. The March 19 *Computerworld* contained several of those stories.

All of the answers aren't known, but it would be nice — albeit probably impossible — to get answers to the following questions:

- Why doesn't the Labor Department sponsor more job training programs that guarantee disadvantaged people jobs upon completion, like the recently signed contract with Control Data Corp.? This seems to be a program that could be emulated by most firms in the computer business, particularly the larger companies.
- Why haven't any of IBM's competitors in either the supermini or plug-compatible processor market been able to match the IBM 4331's price? Everyone is indicating their systems are better price/performers, but no one has yet gotten under that 4331 price level.
- Why doesn't the Smithsonian Institution have a budget that could cover the "few thousand" dollar cost of moving the first IBM 709 system to Washington, D.C.? Frankly, the computer portion of this national Museum for Science and Technology leaves a lot to be desired, considering the number of "artifacts" available.
- How long are stupid mistakes going to be permitted in programs for such important things as the safe design of nuclear reactors? Consumers are going to be charged millions of dollars extra this year because one mistake wasn't caught in 1972.
- Why did banks claim it would cost them $1 billion to notify customers of their rights under the Right to Financial Privacy Act and why did Congress believe them and let them off? Banks communicate with their customers regularly with statements, often enclosing advertisements for loan services with those statements. Notification could have been handled in the same manner with very little increase in cost.

Data Past

Five Years Ago
March 27, 1974

NEWTON, Mass. — In a survey of IBM and non-IBM small system users, *Computerworld* found the efficiency of the IBM System/3 depended on the user's ability to plan well and forecast future expansion needs. Most of the non-IBM users said they were satisfied with their systems despite some initial doubts about operating bugs and software inadequacies.

Eight Years Ago
March 31, 1971

SAIGON — U.S. computers were turned over to the Vietnamese armed forces along with the job of fighting the Viet Cong. This meant a massive effort undertaken by the Vietnamese forces with the monetary support of the U.S. Every indication was given that computerization would be among the most successful aspects of Vietnamization.

Letters to the Editor

IMS No Embarrassment

A love-hate relationship with IBM's Information Management System (IMS) since 1968 prompts me to brand Stephen L. Robinson's comments in "Freeze on IMS Updates Predicted" [CW, March 12] as much the same type of tripe I fed my six year olds when explaining boogeymen to them.

As a charter member of the original Share/Guide IMS User Group Steering Committee (established Aug. 8, 1969), I have watched the IMS user community grow from a handful to more than 2,000 users today.

An estimated 2,000 users paying a minimum license fee of $1,000 monthly generates income of $2 million monthly. That rate doesn't imply "a source of embarrassment."

Early in the article, Robinson refers to IMS' complexity, while his predictions at the end include relational data bases and distributed data bases. We will learn what complexity is when either of these two become economically operational.

Finally, Robinson suggested an IBM freeze on IMS would "cut [users] off at the knees." I should like to be present when the board chairman of IBM tells the board chairmen of users like Exxon, General Motors, Phillips Petroleum, American Airlines, Rockwell International, Equitable Life, First National Bank of Chicago and others of the coming amputation.

Daniel F. Brooks
IMS Education
Palo Alto, Calif.

Missed Other Angles

I was very interested to read "DP Checks Cut HEW Outlays for Student Aid" on the important changes made in 1978 in the edit procedures for student applications for about $2 billion in Basic Educational Opportunity Grants [CW, Feb. 26].

A problem in not rounding out the story results in the emphasis on the savings (about $300 million) which have arisen and the fraud that has been uncovered by tightening the edits of incomplete or inconsistent information supplied by student applications. The story did not emphasize what it is like to be a student attempting to get through a system which initially "rejects" about 36% of about 3.5 million applicants before any determination of eligibility.

The confusion engendered by the form instructions, the misunderstanding prompted by the "rejection" letters, the time delays in submitting corrections (only three quarters make it through successfully the second time), the busy signals on the 800 numbers as students try to check on their status or to learn what corrections information is needed and the absolute drop in the number of low-income persons receiving basic grants were all important angles omitted from the story.

Layton Olson
Vice-President
National Student Educational Fund
Washington, D.C.

Grosch a Grouch?

Although I am not a Ph.D., it would seem that Dr. Herbert R.J. "Rough Jaws" Grosch is a grouch. I refer to his article in the March 5 issue.

I believe he is probably correct in his assumption that the snafu syndrome is prevalent at the National Bureau of Standards, but his use of (interjections) and quasi-intellectual (Shakespearian quotes) tidbits detracts from the facts.

Grosch also seems to be a bit of an egotist. ,

Art Adams
Oklahoma City, Okla.

The Human Connection

Do DP Managers Delay, Suppress Transfers?

By Jack Stone
Special to CW

Twice in as many weeks, I have been contacted by a reader who suggested I write a column on a matter of great personal concern, one which the reader felt would not otherwise get proper attention.

The first one dealt with differences of opinion regarding federal government job standards [CW, March 12]. The second, the subject of this column, pertained to the question of how managers handle personnel transfers.

Although I never took a college course in ombudsmanship, I am more than willing to review letters from readers regarding employment problems or related social or management issues, writing them up in as evenhanded a style as possible.

Selecting Letters

Reasonable ground rules for selecting a letter for publication would seem to be:

- The subject be one of general interest.
- Upon request, names, dates and places be held confidential.
- I shouldn't be asked to get personally involved with any situation.
- Neither *Computerworld* nor I should be the object of a lawsuit.

Returning now to this week's subject, a reader sent me a photocopy of a page from the Feb. 26 issue of *This Week*, an internal publication of IBM corporate headquarters at Armonk, N.Y., and referred me to the Q. & A. column called "Speak Up!!!" The following quotes are extracted from this column (with some minor editing).

Q. "What is the minimum time an employee must be in a job before a request for transfer (RFT) can be submitted to the personnel department?"

A. "The manager looks at such factors as the needs of the business, personal reasons for requesting the transfer and the employee's performance in the current job to determine when and if a request should be approved. As a practical matter, there is usually a minimum time involved in determining performance in the current job."

Q. "Is it correct to assume that the personnel department is the only one that matches skills and educational backgrounds of an individual . . . to the available job openings?"

A. "The manager is responsible for placing employees in assignments which best use their skills, educational background and work experience . . . The personnel department, as a staff function, supports managers in carrying out their responsibilities and assures that a timely and thorough review of RFTs is completed."

Q. "Can management refuse to accept an RFT submitted by an employee and/or, once accepted, delay or completely refuse to process the RFT to personnel for future job considerations?"

A. "While IBM will try to accommodate the personal desires of employees requesting transfers, each request is considered on an individual basis and the decision is based on the factors we've noted."

Maximum Sentence

Q. "Once a job match has been made by personnel and an employee successfully interviews, what is the maximum time a person can be held in his/her present job before being released to the new job?"

A. "Prior to the interview, the manager and the employee should have a mutal understanding as to the availability date. When the employee accepts the new assignment, the report data should be honored.

"The question of a maximum release data is difficult to answer because of the many factors involved. The usual period is 2 to 4 weeks, but may be longer for critical business reasons."

Although the policies seem reasonable enough, the reader obviously was not thrilled with their execution when he/she wrote,

"Point: The IBM personnel department is a sham.

"Point: The IBM employee is at the mercy of the first-level managers. (Note: the manager could, and often does, break every rule in the book. Honesty is not a desirable trait.)

"Point: IBM managers would go to any extent to prevent the transfer of an employee who is the key for the manager to receive a promotion. (Promise the employee everything and forget it all after you get what you want.)"

Only Conclusion

Quite obviously, the only responsible conclusion that a rational person could make based on the above is that IBM has at least one disgruntled employee on its hands.

But what is bothersome here is that one has to wonder just how widespread are the concerns over possibilities of delayed or suppressed requests for transfer, not just in IBM which, I believe, enjoys a fine reputation for excellence in personnel administration, but throughout the industry.

Letters to Stone should be addressed to him at Suite 222, 2233 Wisconsin Ave. N.W., Washington, D.C. 20007.

The Taylor Report

IBM Delivery Dates Mean Customer Waits

By Alan Taylor
Special to CW

IBM marketing techniques — its scheduling of delivery dates in particular — can prove troublesome to users. In the 1960s, when IBM began marketing its 360 series, it promised delivery dates, but failed to keep them.

The private lottery that IBM recently held to determine delivery dates for System/38 customers is an example of another questionable marketing tactic.

System/38 "first-day orders" were taken for the period of Oct. 24 to Nov. 10. They were referred to as such because they were all to be pooled into a lottery and treated the same [CW, Feb. 19]. Customers were told the systems would be delivered starting in August; the wait for delivery was apparently 10 months.

No Exact Dates

Exact delivery dates were not given. Meanwhile, the secret lottery took place, and computer buyers were kept very much in the dark.

While I don't have full details, reportedly some of those 10-month delivery waits were extended (even for first-day orders) to June 1980.

A few months before the announcement of the System/38 — with its delivery lottery — another marketing gimmick was employed in connection with IBM's Series/1 minicomputer. Starting, as far as I currently know, about June 1978, IBM salespeople sold Series/1 hardware and (on IBM's behalf or otherwise) other companies' hardware and software products compatible with the Series/1.

They used as a major selling point software controlled by IBM, which was originally independently developed. Cobol-type language facilities, coupled with attractive hardware prices, obtained sales.

The software was expected by the end of 1978, but customer expectations for delivery were disappointed. The manuals turned out to be inadequate and while the language was practical, the disk space was not.

Language facilities linked by monitors to the hardware were unreliable. This was not known until early this year, by which time a superior Cobol was offered by IBM with deliveries set for this summer. But this meant a six-month delay for customers.

So, IBM customers have continued to wait. On the surface it

(Continued on Page 36)

Reader Commentary

End Ado Over Auditing: Hire an Outside Firm

By Robert W. Howe
Special to CW

I have been following the recent *Computerworld* articles on the skills of the DP auditor, and I believe too much emphasis has been placed on the internal auditor, with little or no discussion of a second alternative — the outside auditor.

This alternative is particularly relevant when considering the cost of a full-time internal auditor to the small company.

My company has 70 employees, 20 of whom are programmers. Staff work is divided between maintenance and projects on a ratio of 1:4.

In evaluating the advisability of an internal DP audit, we were faced with two basic questions: Could we justify the salary of an in-house DP auditor based on our volume of work? Could we expect the individual to maintain total objectivity when required to work so closely with the operating staff?

The answer in both cases was no.

We decided to contract a certified public accounting (CPA) firm with DP audit capability to do application software audits. These audits provided management with a report on the control weaknesses of the systems and assisted management in implementing proper procedures for improving controls.

In total, four application audits and one environmental audit were conducted.

Advantages Apparent

The advantages of the outside audit over the in-house auditor were apparent in four areas. First, the diverse experiences of the individuals conducting the audit resulted in a perspective which might not be readily available from an internal audit.

Second, the objectivity inherent in a third-party audit exposed areas of operation which heretofore had been accepted as standard operating procedure and would probably have been accepted as such by an internal auditor.

Third, since the firm provided continuity of personnel throughout each audit, the need for relearning the systems was eliminated.

Lastly, the "comfort level" of our users was significantly enhanced as a result of these impartial audits. A comparable enhancement probably would not have resulted from the use of an

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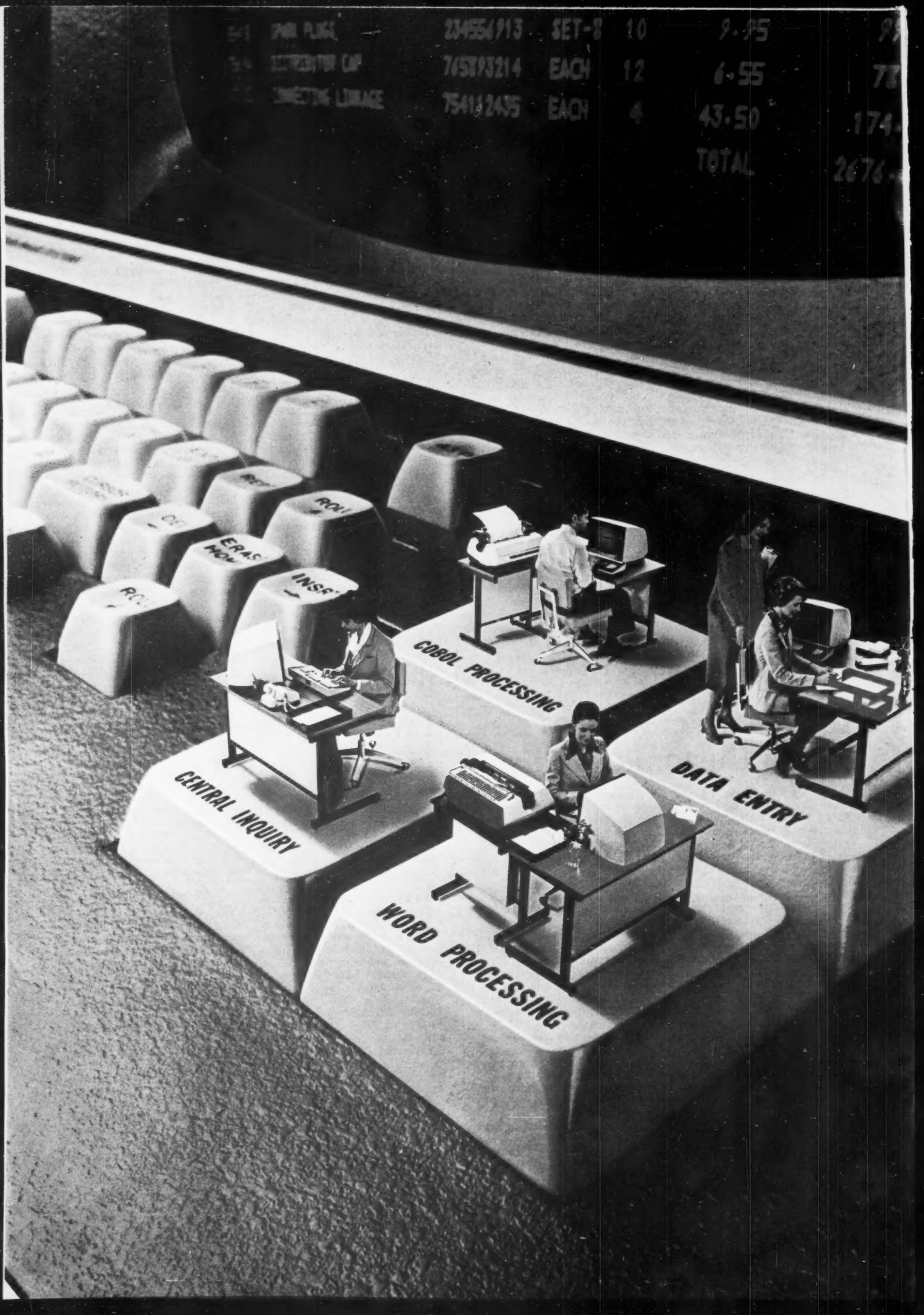
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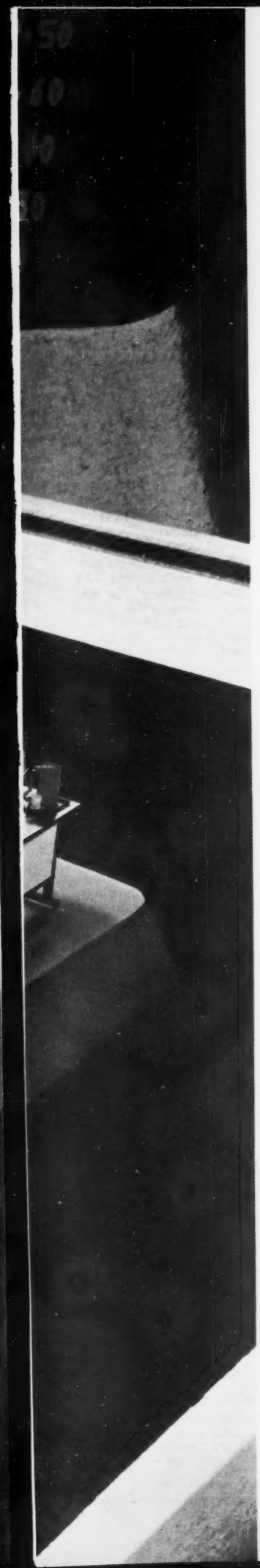

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IBM Delivery Dates Mean Customer Waits

(Continued from Page 33)

seemed like the 1960's scenario, when IBM was unable to meet promised delivery dates for its 360 series.

Tort Law Can Help

In 1964, because of the terms of IBM contracts, customers could not do much about the delays. But the law, as well as the technology, has since changed.

In fact, the law seems to be catching up on ways to deal with tricky contracts and this type of marketing practice. It may be helpful to apply the law of torts, or civil wrongs, to such cases.

The problem with tort law is its inaccessibility. Unlike contract law, there is no agreement to study. Unlike statute law, there is no statute to see.

Tort law is based on individual cases, and they're so voluminous that it's hard to come to a consensus about the law's meaning. You can never be sure that you've covered everything.

But even lawyers move with the times and in 1966 — two years after the IBM 360s were put on the market — the influential American Law Institute came out with a definition of one particular tort.

It stated, "One who, in the course of his business, profession or employment, or in a transaction in which he has a pecuniary interest, supplies false information for the guidance of others in their business transactions, is subject to liability for pecuniary loss caused to them by their justifiable reliance upon such information, if he fails to exercise reasonable care or competence in obtaining or communicating the information."

This puts a whole different light on some of these marketing matters. For example, if a salesperson sold a System/38 just before the cutoff point for "first-day orders" without telling the buyer that IBM's production facilities would take about a year to get him his equipment, would he be exercising "reasonable care or competence"?

"Reasonable care" means a person uses his available knowledge and skill in a reasonably competent manner. If a salesperson or his company knows information is misleading or incomplete and fails to warn the customer, this could constitute a lack of reasonable care.

The trend today in law seems to be against exemption from liability for wrong conduct. Perhaps the law can deal with these marketing gimmicks. For the sake of our profession, let us hope so.

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Hire Outsider For Auditing

(Continued from Page 33)

in-house auditor.

Clearly, some will say that the drawbacks of outside audits are that they are very expensive and that they are often initiated long after a system has been developed and put into operation in the company. In response to the first point, I would say that the total cost of the four application audits and the one environmental audit was less than the annual salary of a DP auditor.

The argument against "after-the-fact auditing" is legitimate. To avoid this problem, we have recently initiated preinstallation system audits that are conducted by a third-party firm before the software is put online.

Obviously, most large companies require the services of a full-time DP auditor. However, for smaller firms, the outside audit represents a very attractive alternative.

Howe is executive vice-president of Savings Management Computer Corp., a Boston firm that offers online services to the thrift industry.

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Immediate Future Bright, But . . .

Developing Trends Could Affect Use of FM

By Richard S.Mathews
Special to CW

Evidence pointing to a bright future for facilities management (FM) was published in these pages in January [CW, Jan. 8, Jan 15]. Since then I've been observing what appear to be developing trends that could have long-range effects on the FM business.

Perhaps I should emphasize at this point that the views I express in this commentary should not be construed as conflicting with my earlier forecasts on FM's long-range potential.

Even though the immediate future for FM does continue to look bright, these trends will make it difficult for small, loosely managed FM firms to survive. As a result, I see the future of the FM business as one of uncertainty.

The surviving concerns will be large, well-managed firms which will invest heavily in R&D and in the recruitment and training of DP personnel.

The trends I see taking shape are attributable to several factors, foremost of which is IBM's recent announcement of the 4300 series computers and their proposed software support. For one thing, the 4300 machines, which are compatible with both the 360 and 370 lines of computers, offer significant price/performance advantages over previous IBM models.

Then, too, IBM's technical software support — to be available via telephone — should have wide appeal, especially among banks and those smaller business concerns unable to justify having system development personnel on their payrolls.

Because of the 4300 pricing strategy alone, it is a foregone conclusion that much of the economy-of-scale benefits that FM firms have had over prior generations of computers will be removed.

Software Firms

Another trend involved the decisions of some software firms to enter the FM business and discontinue selling their products to other FM companies. Those FM companies then make substitutions which are often less efficient. Some — through their customers — buy the better software at prices that the customer would pay.

This is serving to diminish the claims of FM companies which talk of superior software at costs substantially below what an individual firm could acquire on its own.

Also contributing to these trends are the rapid technological advances in computer miniaturization and on-line, communications-oriented systems. The FM software that looks great today could end up being far behind the leading edge five years from now.

Growing Need for Control

I also see problems brewing with the growth of the high-technology, people-dependent FM business today and in the immediate future. As it doubles in size every four to five years, FM management steadily expands its span of responsibility; as a result, there is a growing need for control.

Control, in its many interpretations, is the watchword for bankers and other businesses considering FM.

Still another factor worth considering here is the pressure under which FM firms must perform as bankers and others become more demanding during contract negotiations and set higher performance standards. This is beginning to drive smaller FM firms from the business.

And, finally, there is a growing problem in finding and retaining effective site managers. These are persons who are capable of meeting operating performance and profit objectives while possessing skills in communicating effectively with the customer's top management personnel.

Reader Commentary

The site manager replacement rate, I note, is increasing steadily because of incompetence and incompatibility.

Many of these trends, however, will become major advantages for those FM firms that do survive. Since all organizations, — not just FM firms — have to cope with technological change and the shortage of skilled personnel, the FM concept will remain attractive to banks and other businesses that want the guarantee of a high standard of operating performance at a preset operating cost.

Mathews, president of Mathews & Co. in Darien, Conn., management consultants to the banking and finance fields has been assisting clients in the selection of FM firms and negotiation of contracts.

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PRODUCTS FOR PERFORMANCE

A Distinguished Group

N.Y. Amateur Computer Club: Few Amateurs

By Joe Rigo
Special to CW

They call it the New York Amateur Computer Club. In fact, there is hardly an amateur in the place.

About 60 people show up for a meeting. They are overwhelmingly male, predominantly young and mostly enthusiastic — especially when promoting their own user group or commercial product.

Brian Glasser, the club treasurer, sits up front. Before the meeting, he collects dues and passes out copies of the price list for his discount microcomputer components and supplies.

Bob Schwartz wanders around the room. Schwartz founded the club three years ago. Currently, he is promoting his Computer Flea, a monthly trade show and lecture series for hobbyists and small business users.

Reader Commentary

Laird Whitehill hands out flyers for his Micro Business Users Group. He urges other members of the club to attend his meetings. He tells them they will have access to real users and will be able to promote their business services, just as he does.

Still, not everyone is hustling. And those who are keep it under control. No visitor will be assaulted by a sales pitch unless he asks for it.

Three Groups

In general, there are three groups in the room:

- *The entrepreneurs.* They are in constant motion, organizing club activities and promoting services. On one side of the room, Ed Gittelson sells this month's issue of *Creative Computing* magazine. Nearby, two other members try to organize a volunteer group to build a computer from scratch.
- *The electronics hobbyists.* They are building or buying computers for home use. They sit quietly, waiting for the evening's technical program, or form small groups with other hobbyists.
- *The users.* They own small businesses. A typical member of this group has just ordered a small computer. He is at tonight's meeting to learn something about computing before the shipment arrives.

The users are truly out of it. They are starting from scratch, but they know it, and they seem to be prepared for a long, hard pull.

Most of the entrepreneurs and hobbyists have prior experience. Many are recent computer science graduates. A lot of them work days as programmers in large IBM shops.

Distinguished Gathering

It is a distinguished group in at least one sense. There are probably more corporate presidents in the room than at any meeting of the American Management Association.

Some of the users at the meeting run substantial, well-established companies. The entrepreneurs tend to represent one-man or two-man operations. Many of the corporations function only on evenings and weekends.

This, of course, represents another vacuum to be filled. So a member of the group is organizing a sales office in Times Square. It will represent many of the independent operators in the room.

Four-Part Meetings

The meetings take place in a large room at Bernard Baruch College on 23rd St. in Manhattan. They are held on the second Thursday of the month.

A typical meeting is in four parts. The first part is announcement of club activities. There are user group meetings, a convention to plan, study groups in basic electronics and the people who are building their own computer.

Part II is called "Random Access." Anyone can announce anything. Most of the announcements are commercial. People are selling products, looking for programmers, trading software packages.

Part III is a break. Members who are interested in an activity or product can go talk with whoever made the announcement.

Part IV is the technical program. A guest speaker talks about his new language, developments in the industry or his application of a microcomputer. At this time only, the club looks pretty much like any other computer group in town.

Abby Gelles presides over it all. By day, Abby is a systems programmer in a large IBM environment. On the second Thursday, she is president of the amateur computer club.

The meeting is lively, but it always ends by 10 o'clock. It has to. That's when the building's elevators stop running.

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Australian DPers Put Emphasis on People

By Dr. Herbert R.J. Grosch
Special to CW

I've just returned from a hurried but exciting trip to Australia. Now, I agreed not to do too many travel pieces in this space — didn't tell you about my adventures in Taiwan the week after Jimmy pulled the plug! But my hosts are key people in the arrangements for the great triennial gathering of the International Federation of Information Processing (Ifip) clan next year in the Pacific.

Moreover, *Computerworld* now has a sister, *Australian Computerworld*, and I met Susan Coleman, the Melbourne bureau chief of the new paper, at the meetings I attended.

And most of all, for beleaguered readers in snowy Chicago and freezing Fargo — it's summer Down Under!

Well, the adventure began some months back with a telephone call from the Victorian Branch of the Australian Computer Society (ACS). That's based in Melbourne; Victoria is the state, as New South Wales is the state for Sydney. They wanted to fly me down for their annual conference, which was to be held at Cowes, on Phillip Island in the outer reaches of Melbourne's bay.

I had to squeeze; the week before was the Association for Computing Machinery's (ACM) Computer Science Conference, or academic meat market, in Dayton.

I planned to go directly from Dayton to summer. By leaving right after the ACM Council disbanded on Friday, I could fly briskly to Los Angeles and board a nonstop shorttail to the South Pacific.

The 747 SP has a certified range of 8,100 statute miles, and I'd flown one from San Francisco to Taipei in December. The cabins get pretty piggy after 12 or 14 hours aloft, but it's still a technical miracle.

I cast about for excursions. Could I spend a day or two in Samoa? New Caledonia? New Guinea? No, the schedules didn't fit — and I'd done Tahiti before, and the South Island of New Zealand. So I headed for the Great Barrier Reef, the largest structure on earth built by living creatures, except perhaps IBM.

Imagine a pile of card chips 2000 kilometers long, infested with sharks and salesmen and other savage creatures, with the north (tropical) end blistering under the summer sun and with cyclones sweeping down from the Coral Sea. I changed planes in Sydney and Brisbane and by the Sunday night I was in Cairns, latitude 17°S. Fantastic!

It was hot — too hot for regular tourism. But I hitched a ride out to Green Island with a Ministry of Works party, on a great twin diesel marlin fisherman, and did the underwater observatory, and the crocodiles, and the white beach. The town, the metropolis of North Queensland, was small but friendly. Definitely the wrong season, though.

Then, pursued by tropical cyclone Rosie, which two days later devastated Mackay, the next town south, I flew off to Melbourne and Cowes. Cooler — although still summer.

Ifip will be in early October, which corresponds to our northern April, but the Victoria climate is gentle. The skies are clear; the Southern Cross, bright; the natives, friendly — very friendly.

White Hat, Black Hat

The conference was smaller than expected, in spite of a resort location. All the domestic air flights, and many of the international ones as well, were crippled by a jet-fuel handlers strike, so that Qantas and Pan Am were refueling in Noumea or Auckland or Nandi rather than in Sydney.

The ACS president lives in Perth, 2,000 air miles away in Western Australia. Speakers were to come from Sydney, where dislocations were most serious. But those of us who got there had fun.

There is a koala bear preserve — they climb pine trees as well as eucalyptus, and I have slides to prove it. Fairy penguins march up the beach from their day of fishing and swimming and sleep in snug burrows until dawn (and hatch their eggs, but not in March).

About the conference, now — the

(Continued on Page 40)

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DPMA Fighting Tennessee Software Tax

By Robert M. Sherin
Special to CW

In a surprise move, the Data Processing Management Association (DPMA) recently asked the Sixth U.S. Circuit Court of Appeals for permission to intervene in the case of Sherin vs. Tennessee. The suit seeks equal tax treatment in Tennessee for data processors with those of equivalent status.

At issue is whether the State of Tennessee violated the Fourteenth Amendment "rational basis guarantee" when it classified the same software as tangible that was previously declared intangible by the Tennessee Supreme Court.

Representing the DPMA, Richard Raysman, a New York attorney, pointed out in his application to the court that "a decision of the court adverse to the plaintiff could shift, literally, millions of dollars from the data processing industry to the State of Tennessee, which would result in fewer jobs for data processing professionals who are members of DPMA and less profits as a whole for the data processing industry."

In making its request to intervene as a friend of the court, DPMA answered a plea made in a recent reader commentary [CW, Jan. 8]. Surely the suit now dwarfs what it was; what was once small is now large.

Imagine, the DPMA, one of the largest data processing associations in the world with more than 22,000 members, is asking a high federal court for enforcement of constitutional rights.

The court is not likely to brush that off lightly.

Sherin is a nonjudicial legislative adviser to the DPMA.

Reader Commentary

Aussies Stress People

(Continued from Page 39)

IBM 4300 announcement hadn't hit yet (Japan would be next week, but none of us knew it), so most of the papers were about manpower and security and small machines. A vigorous professor from Tasmania gave a minitutorial on Pascal, which I enjoyed without succumbing. An interesting young academic from Sri Lanka (Ceylon) who was working with the Holden (General Motors Australia) IBM shop did an extremely detailed piece on capacity analysis.

I did computer industry futures and told some stories at the banquet — gentle ones. Dayton seemed months back as well as a hemisphere away.

Warmest Presentations

The warmest papers at the meeting were about people, about training "school leavers" (high school graduates not able to go on to university) to work in third-party maintenance for an Australian company which also services the giant British Airways computer complex at Heathrow. Not an apprenticeship program; that pays too poorly and needs union or government approvals. Real work at a real salary, but with close supervision.

From Qantas or from IBM I would have been pleased; from 300-employee Datronics, I was deeply impressed.

Both ACM and the British Computer Society have programs relating to handicapped computer people and trainees; the British and the Australians say "disabled." In Australia there is an impressive woman named Sheila Blackmore who has established a now-well-supported training system in office and computer careers. She talked to us about recent progress and human successes.

We felt warm, excited; it's a small effort, carefully aimed. The ACS is fully persuaded.

I told about the ACM Special Interest Committee on Computers and the Physically Handicapped and also about chip implants for the deaf and other computer prostheses, which was new to many of the DP applications people present.

Roy Paterson, my host, drove me up to the Melbourne airport in his new Lancia. Qantas *did* fly, albeit reluctantly and jam-packed. I got back to San Francisco on schedule.

Already it all seems like a dream; I read of snow in the Middle West and Carter orbiting over the Middle East. Australia was great!

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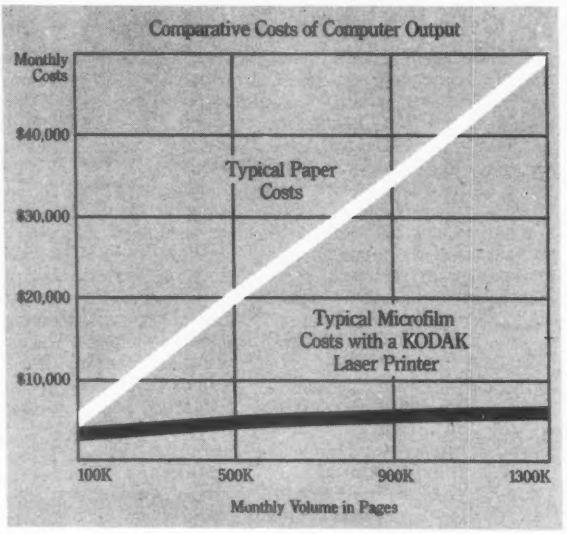

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With Understandable Terms

Graphs Help User Balance Network

By Don Leavitt
CW Staff

ORLANDO, Fla. — Performance monitoring is typically the concern of fairly high-powered DP technicians, but Harris Corp.'s corporate data center has put together a system to help teleprocessing users get a better understanding of the effect of changes in the on-line environment.

The center in Melbourne, Fla., supports users in Texas, New York and Illinois as well as in Melbourne. Both the IDMS data base management system (DBMS) from Cullinane Corp. and Altergo Software, Inc.'s Shadow II teleprocessing monitor are used in collecting, reducing and reporting terminal activity, according to Harris analyst Steve Carson.

Describing his approach at a recent Shadow Users Association meeting here, Carson said he isn't interested in the detailed measurement of things such as CPU time, which mean little to the terminal user. Instead, he put together definitions of "good basic measurements" the users could appreciate and which he could quantify with data already being collected in part by IDMS.

The charts he provides to users — and showed the group at the meeting — consider only "transactions," "transaction response time" and "terminal response time."

The IDMS data is normally placed in a control block by the DBMS, but Harris' coding monitors that data frequently to determine what is going on and to time-stamp the activity. Data received through "hooks" into read/write macros complete the collection phase of the system, he said.

From those sources the user can get information about Shadow terminal I/O, Shadow-triggered Dasd I/O and IDMS-triggered Dasd I/O. The collection was performed by a resident Shadow transaction whose operation was controlled by the user, Carson noted.

Thirteen Histograms

Thirteen separate graphs can be generated by the system. Each is a histogram in form, but the first showed, for example, 50 levels of response time with the total number of transactions performed at each level during a day. Response times were grouped by the closest hundredth of a second, and Carson said this graph is a good means of determining overall teleprocessing system performance.

The average number of Dasd I/Os performed at each response time level, as shown on the second Harris graph, may highlight poor placement of data and resulting excessive head movement. Otherwise it is generally expected that the more the I/Os, the longer the response time, Carson noted.

The third histogram tracked the number of transactions by time of day, with the day divided into 15-minute segments.

A graph showing average response time by time of day, combined with the transaction-count graph, can point to an unbalanced communications load.

The histogram showing average response time by program is helpful in determining which programs cause the longest response times so they can, if possible, be run at different times, he said.

A pair of graphs — showing total number of transactions and total number of I/Os per program — are used at Harris to direct tuning efforts at the programs consuming the most system resources.

The next pair of histograms focused on transactions with an average response time of more than 10 seconds. These provide details on the long-lasting operations that are lumped together in a "more than 10 second" line on the earlier response time charts.

The 12th histogram — showing average response time by I/O rate — is "a good barometer for teleprocessing system performance," Carson remarked.

Finally, a graph showing total number of transactions by terminal can indicate possible line loading problems.

'Copack' Eases Cobol Work

PRINCETON, N.J. — The Cobol Productivity Aid Package (Copack) introduced recently by Generated Systems, Inc. (GSI) is a collection of utility programs designed to simplify program development, maintenance and documentation in any Cobol environment.

Although developed on IBM equipment, the Copack routines are written in ANS Cobol, so conversion to other settings should be a simple process, a spokesman noted.

The package has four primary components. A shorthand processor translates predefined abbreviations into fully spelled out reserved words, data names and procedure names, saving coding effort while providing complete documentation in the source code before it is compiled, he said.

Copack's program analyzer produces enhanced program listings including "usage-specific," cross-referenced information in-line with the program's code. That format eliminates the searches typically needed to make cross-reference entries useful, the spokesman continued.

Copack's third component, a system analyzer, provides a system- or installation-wide summary of programs, COPY Library member usage and of entry points and entry--point invocations. The reports are produced from a utility file that is updated every time the program analyzer routines are used, so output from this component is always current, according to GSI.

A source reformatter — the fourth part of the package — rearranges the text of Cobol programs without affecting their logic.

The package costs $3,500, which includes on-site training and maintenance for a year. GSI is at 245 Nassau St., Princeton, N.J. 08540.

Volunteers Wanted

ROME, N.Y. — The Terminology Task Group of the IEEE Computer Society's Subcommittee on Software Engineering Standards needs help from people involved in any phase of the software life cycle, according to task group chairwoman Shirley Gloss-Soler.

The task group's function — "perhaps it's obvious" — is to help compile a glossary of software engineering terms. It will probably use the IEEE's draft glossary, published last May, as a base but extend that document as far as seems appropriate, she said.

Most of the task group's work can and probably will be done by mail and by phone, Gloss-Soler said, adding that she foresees "probably two meetings a year, one on the East Coast, the other on the West, to make it easy for members to attend at least one of them."

The chairwoman is particularly interested in getting enough help so she can divide the group into specialty teams.

After the task group has done its basic work, Gloss-Soler sees it proposing terms to be included in the glossary, submitting draft definitions of the terms and then refining those definitions after review of the initial suggestions.

People interested in working with the group should contact Gloss-Soler at ITT Research Institute, Box 1355, Branch Post Office, Rome, N.Y. 13440.

Information about the work of the standards subcommittee is available from its chairman, Robert Poston, at 19 Onondago Trail, Medford, N.J. 08055.

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Independent Package Eases DOS-to-MVS Move

MINNEAPOLIS — Land O'Lakes, a Minneapolis-based food processing co-op, made the decision to convert from DOS to MVS in May 1977. Its hardware was upgraded from 1M-byte IBM 370/145 to 3M-byte 370/158.

The MVS operating system was generated, followed immediately by the conversion of all Customer Information Control System (CICS) applications. This was accomplished with the aid of IBM's Virtual Machine Facility (VM/370).

In October 1977, after the successful changeover of the on-line application program VM was replaced by OS/-MVS, along with the DOS Emulator. This set the stage for the larger conversion task, involving all batch jobs.

To assist the transition to native OS/-MVS, Jim Skyjonsby, technical support manager, evaluated three separate software packages. The criteria he used included:

- Computer resources required.
- Ability to comply with standards.
- Percent of source code converted.
- Format of converted output.
- The percent of JCL converted.

The only package which satisfactorily met the criteria was Focus from Massachusetts-based Arkay Computer, Inc., Skyjonsby said. Focus was installed in February 1978 on a trial basis.

Benchmarks during the trial period involved moving 13 jobstreams from DOS to MVS. All programs and JCL were converted and ready to test after only one day of using Focus, IBM's Time Sharing Option (TSO) and Pansophic Systems, Inc.'s source library maintenance package, Panvalet, as conversion tools.

The results of these tests exceeded expectations, according to Skyjonsby, and Focus was purchased the following month.

An important and vital step in the company's conversion plan was to increase temporarily the size of the programming staff with OS-experienced consulting personnel. The decision to use outside assistance was based on the short-term nature of the increased work load and the anticipated benefit of using personnel that were experienced in DOS-to-MVS conversion.

Consumer Systems Services Group, Inc., an Oak Brook, Ill.-based consulting firm, was selected because of its experience in similar large magnitude conversion projects. The consultants concluded the project in December.

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OS-Oriented Users Gain Fortran Debugging Program

ANAHEIM, Calif. — The Fortran Debugging Aid Program (Fordap) from Pilkerton International was developed to eliminate the need for Fortran programmers to look at Abend dumps when they have problems on IBM OS-oriented systems.

When an Abend condition occurs, Fordap gives the programmer information in a form that relates directly to the Fortran source code. For example, a spokesman said, the current values of variables are displayed in their correct format and in decimal, floating-point or integer notation.

"Gone forever," according to the spokesman, is the time-consuming task of converting hexadecimal values into decimal, for instance. Variables are displayed with their correct subscript, "a very valuable aid in finding and correcting problems," the vendor asserted.

The package requires less than 1,000 bytes of storage and runs on any IBM OS/MFT, MVT, VS1 or VS2 system.

Fordap costs $190 Pilkerton was quick to note that most users can justify acquisition of the package from the savings realized from not printing full Abend dumps. Less quantifiable but still significant is the cutback in time needed to develop programs when Fordap is available, the spokesman said.

The vendor can be reached through P.O. Box 6372, Anaheim, Calif.

'IDMS' Gets Fortran DML

WELLESLEY, Mass. — A Fortran data manipulation language (DML) is now available free to users of Cullinane Corp.'s Integrated Data Base Management System (IDMS).

Described as fully integrated with Cullinane's data dictionary, the facility makes it easier for Fortran programmers to use IDMS, much as the earlier Cobol and PL/I DMLs made interfaces to the data bases easier for developers working in those languages, a spokesman said.

Cullinane claims to be the only data base system vendor offering DMLs for all three of these high-level languages. IDMS can operate on IBM equipment ranging from the 360 through the recently announced 4300 series, the spokesman said from 20 William St., Wellesley, Mass. 02181.

Honeywell Planning RPG-II for 6000, 66

PHOENIX — An RPG-II language facility for use on Honeywell, Inc. Series 6000 and Series 60/Level 66 mainframes will be available shortly from the vendor.

Noting that there is no formal standard for either features supported by RPG-II or syntax to be followed in implementations of RPG-II, a Honeywell spokesman said nonetheless that the software will be "comparable to competitive products."

It should be most useful to Honeywell installations converting from IBM System/3 or DOS-oriented 360s or 370s to Level 66 Gcos-based environments, he added.

RPG-II from Honeywell will cost $100/mo for a minimum 12-month license term, he said.

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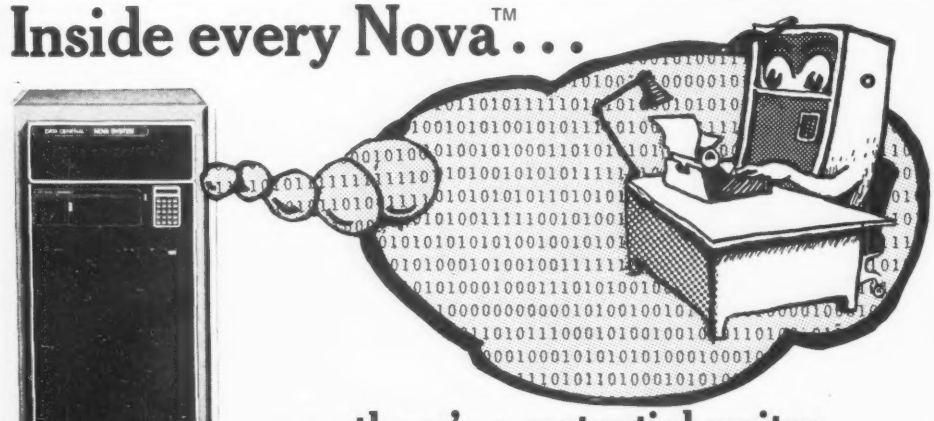

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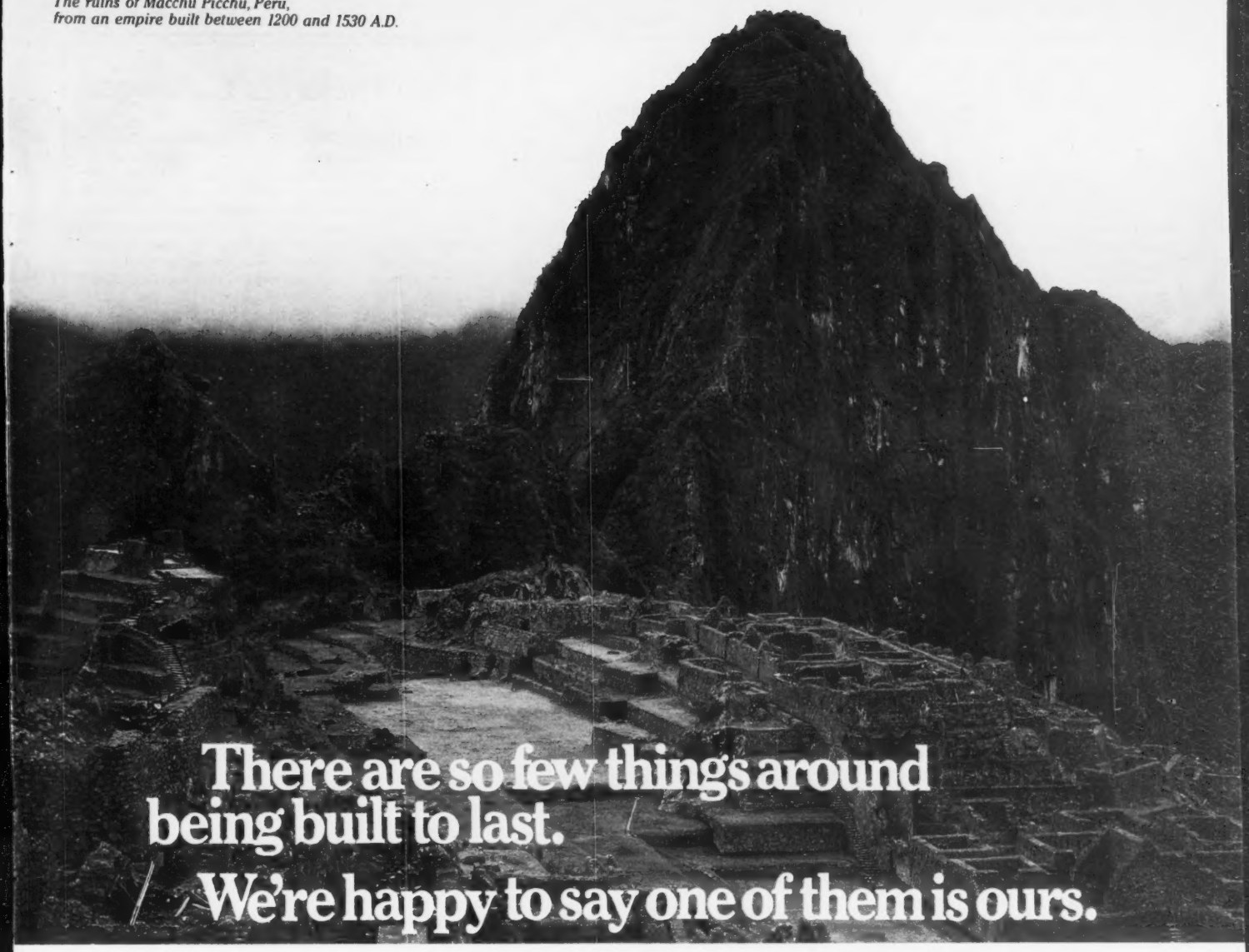

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Written in RPG-II

2200VS Print Support Expanded

ALBANY, N.Y. — An expanded print support system for programs written in RPG-II on Wang Laboratories, Inc. 2200VS minicomputers is now available from Software Solutions, Inc. (SSI).

The software utilizes the expanded print feature of Wang's matrix printers, which allows the printing of double-width characters. Since they are unusual in appearance, characters printed that way would accent the parts of a report in which they are used, a spokesman noted.

The Wang RPG-II compiler doesn't give the user the chance to work easily with such highlighting, however, since it "provides no way to specify that a line is to be printed in expanded mode," the spokesman charged.

With the SSI product, on the other hand, the user gains precisely such control, he said. The programmer works with a ULABL statement to define a one-character field which serves as a conditioner in each output line to be printed in expanded mode, he explained.

The support system is written in assembler and uses slightly more than 1K byte of memory. The increase in execution time is minimal compared with the time required to actually output a print line, SSI said.

The package costs $650 and is distributed as an object file on floppy disk. Source code is available for an additional cost, and multiple installation discounts are available on request, the spokesman added from 26 Computer Drive East, Albany, N.Y. 12205.

'DTSS' Comes With Fortran 77

HANOVER, N.H. — The Fortran now being shipped with the DTSS interactive software system complies with the 1978 American National Standard specifications for the language — the standard commonly known as Fortran 77, according to DTSS, Inc.

The current implementation has been extended even further — in terms of ease of use — with the availability of debugging aids that weren't possible until now, a spokesman said.

While Fortran 77 is included in the DTSS software system (which costs $9,000), it can be acquired separately by those installations that wish to use only that language, he said from 10 Allen St., Hanover, N.H. 03755.

Mini Packages Cataloged

ENGLEWOOD CLIFFS, N.J. — The 1979 edition of the "Catalog of Minicomputer Software," published recently by Resource Software International, Inc. (RSI), includes 100 more programs than last year's edition and brings the total to 330 programs across a wider range of applications.

Most of the programs are written in Basic for ease in implementation on virtually any make of minicomputer. New applications include bill-of-materials processing, order entry, legal, personnel, medical and computer-aided education.

The 400-page loose-leaf catalog costs $49.95 plus $5 for postage and handling. It is available now from RSI at 140 Sylvan Ave., Englewood Cliffs, N.J. 07632.

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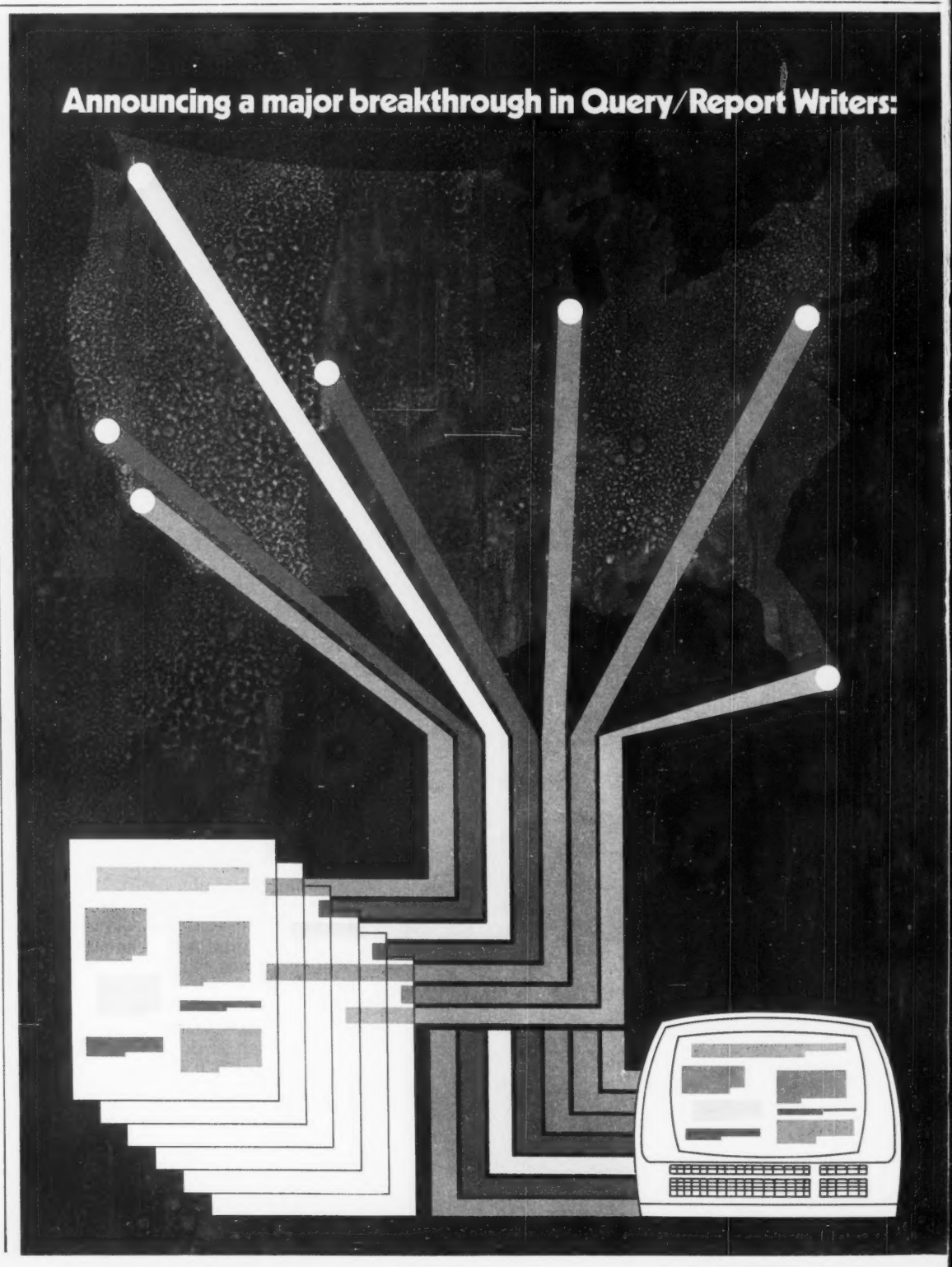

Courses Slated on OS/VS

AVON, Conn. — Technicians attempting to deal with the IBM OS/VS environment may be able to get some help from various courses being offered during April by Computer Systems Research, Inc. (CSR).

A five-day intensive course on external communications and control of Job Entry System 3 (JES3) will be presented in Springfield, Mass., starting April 9. The registration fee is $765.

At the end of the month, the company plans another five-day course on JES3 in Springfield, but this time on the internal logic and structure of the systems. That course will start April 30 and cost $875.

In between those seminars will be one on "MVS Internal Logic, Systems Design and Performance," which CSR has scheduled for April 23-27 in Los Angeles.

The MVS course costs $775, CSR said from 195 W. Main St., P.O. Box 45, Avon, Conn. 06001.

'Datareporter' Update Has Extended Editing Facilities

DALLAS — Release 2.4 of the Datacom/Datareporter includes extended editing facilities, user exits to improve its flexibility and improved installation aids, according to a spokesman for the vendor, Applied Data Research, Inc.'s Datacom Division.

Based on the CA-Earl retrieval software that Datacom acquired from Computer Associates, the stand-alone package has been modified to provide user-specified editing of output fields. This means users can now place commas, decimal points, dollar signs and minus signs where they want them, regardless of prior data definitions.

Optional user exits at control breaks and between reports allow the user to do such things as handle form changes or modify report routines before continuing.

One of the exit points, early in the Datareporter processing cycle, might even be used to provide linkage to a data base management system (DBMS) other than Datacom/DB, which is already interfaced.

Enhanced installation aids allow easy tailoring of user specifications and simpler physical installation at the user site, a Datacom spokesman said. A "cookbook-type" installation procedure makes it possible to install the package in an hour, he claimed.

Although Datareporter is only available to users of Datacom/DB, it can work with files organized under most of the conventional access methods as well as with the DBMS.

Release 2.4 of Datareporter is available now for $8,250 from ADR at 3707 Rawlins St., Dallas, Texas 75219.

Accounting Tools Written in RPG-II

HOLLYWOOD, Fla. — Five general accounting packages, each written in RPG-II for use on the Univac BC/7 or the IBM System/32 or System/34, have been introduced by National Software Marketing, Inc. (NSM).

Applications supported by the packages are accounts payable, general ledger, payroll, order processing and accounts receivable, according to a spokesman.

NSM has set a $799 price tag on each module. The software is sold with installation instructions and telephone access to programmers for operational questions, the spokesman noted.

NSM is at 4701 McKinley St., Hollywood, Fla. 33021.

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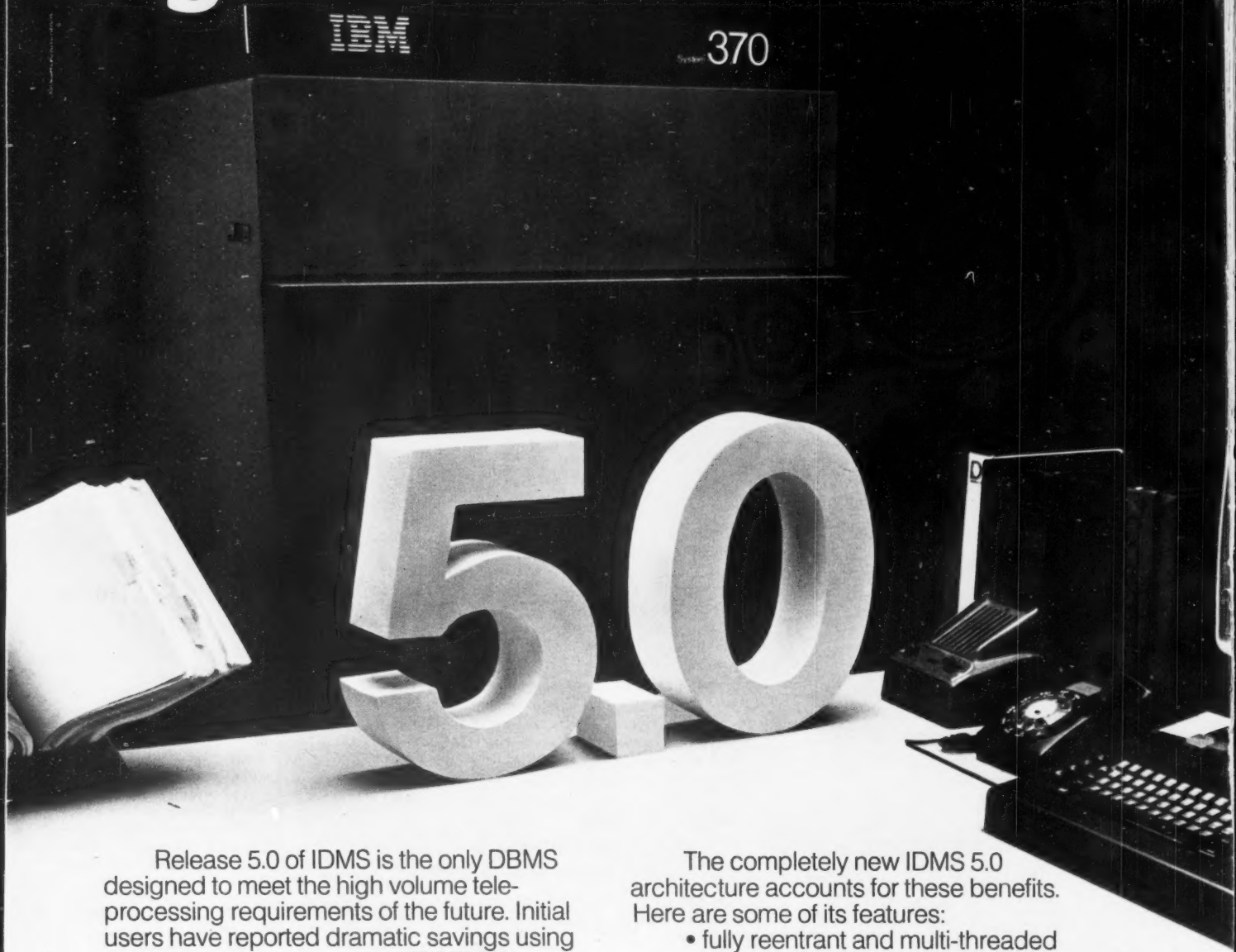

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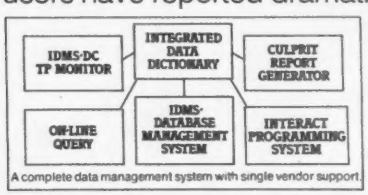

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Report Generation Backed On PL/I IBM Machines

FAIRFIELD, N.J. — The Management Reporting System (MRS) from Magda Corp. is a report generation tool designed to minimize programming effort while providing users with easy access to files and data base either in an interactive or a batch environment on any system that supports PL/I, according to the vendor.

Free-format, English-like statements allow the user to select records, perform arithmetic calculations and table lookups, sort the data and produce tabular reports and graphic displays which feature control breaks, subtotals, totals and independent total processing on all fields, whether printed or not, a spokesman said.

The reports are formatted based on user criteria and executed immediately with this load-and-go system. The formatting options include multilines per record, label processing, letter and text printing and a choice of graphics.

Graphics Interspersed

The graphics can be interspersed with tabular data so that, for example, subsections of a report can be shown both ways, and so can report totals.

MRS includes single- and multiple-file processing, multilevel indexing, test data generation and "simple but comprehensive" record selection, record matching and field scanning capabilities, the spokesman claimed.

In addition to batch processing, MRS supports an interactive mode for on-line inquiry and reporting. The package interfaces with various data base management systems including IBM's IMS, Cullinane Corp.'s IDMS and Cincom Systems, Inc.'s Total; it operates at maximum I/O speeds, the spokesman said.

The Magda package runs on IBM 360s and 370s under DOS or OS or their VS counterparts; it also runs under the Time Sharing Option (TSO) or under the Conversational Monitor System (CMS). At the other end of the scale, it has been implemented on IBM's Series/1 minicomputer under the Real-Time Programming System (RPS).

MRS costs $10,000 and is available from the vendor at 1 Maria Place, Fairfield, N.J. 07006.

PDP-11s Get Job Accounting

TOIVOLA, Mich. — A job accounting system for installations using Digital Equipment Corp. PDP-11s running under IAS is now available from Engineering Systems Research Co. (ESR).

The system provides a summary of I/O device and CPU utilization on a per-job basis, a spokesman said. It also provides a summary of spooled output files giving the number of pages printed, the number of lines printed and the number of operator interventions requested by the user, presumably for such things as forms changes.

The ESR package also prints a listing of time-shared jobs and spooled output, sorted by account for specified time and data parameters, the spokesman continued.

Users are given totals for each account including dollar amounts computed as a linear combination of the system resources used and the volume of spooled output. Included in these dollar totals are all acounts shown on the previous report, he noted.

The software, working with all versions of IAS from V1.0 forward, supports accounting of concurrent usage. Dollar rates are set or altered for any accountable device through PDS commands, and the accounting printout is triggered by other PDS commands, according to ESR.

The price of the accounting system is in the $2,000 range; the package can be ordered from ESR, Rte. 1, Box 104, Toivola, Mich. 49965.

'Compu-Rate' Enhanced

METUCHEN, N.J. — Support for a shipment history and a reporting facility have been added to the Compu-Rate freight rating and billing system, according to the vendor, Transportation Concepts and Services, Inc. (TCS).

The Compu-Rate system maintains freight rates for all modes of transportation, rates bills of lading, audits freight bills, interfaces with the user's accounts payable system for carrier payment and provides management reports for distribution, transportation, accounting, sales and marketing personnel, a spokesman explained.

Compu-Rate V extends the system so users can accumulate a data base of rated shipment transactions for both management reporting and detailed analysis along lines defined by the user. With these facilities, users can have a better perspective on their current operations.

TCS expects the system to be especially useful to a shipper with an annual freight bill of $10 million or more or with 8,000 to 10,000 freight transactions monthly. The reporting support enables this user to gain an edge in rate negotiation, service analysis, mode and carrier selection and other related comparisons, the spokesman added.

Compu-Rate V is written in Cobol for use on IBM 370s. It costs between $50,000 and $70,000, the vendor said from 20 Highland Ave., Metuchen, N.J. 08840

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RAPID CITY, S.D. — By adhering to tough documentation standards, many DP managers could substantially boost their departments' productivity, according to David B. Ellis, a data processing instructor at the National College of Business (NCB) here.

"While the cost of system hardware and memory shrinks, DP salaries continue to climb," Ellis pointed out. "So, each year, a larger portion of the DP budget goes to personnel. That makes it increasingly important for managers to use techniques that can help their highly trained, well-paid staffs become more efficient and productive."

Improved documentation can reduce the time programmers spend debugging, maintaining and modifying programs, freeing them to concentrate on program development, he said.

Ellis was previously a systems analyst for an engineering firm. He started developing his own documentation standard snd procedures while designing a complex company accounting system.

Since then, with the help of other DP professionals like Michael O'Heeron at the University of South Dakota, Ellis has compiled and refined a set of documentation standards and has published a 50-page booklet on the subject. It is required study for all students enrolled in NCB's introductory programming course.

The documentation recommendations also are used by advanced students involved in NCB's field study program.

Service by Students

The college offers degrees in DP and a variety of other business disciplines. It has approximately 2,000 students enrolled in its full-time programs and extension courses.

The DP department is the largest at the college. "One of the best things our college offers DP students is work experience with real world problems," Ellis said.

To provide this training, the college contracts for service bureau work, and students handle 90% of the programming and processing. For example, Ellis supervises students who handle payroll and accounting applications for a large company in Rapid City.

"With the high turnover of students, it would be impossible to provide service without good standards," he continued. "But because our documentation is thorough and includes detailed explanations of algorithms, references and variable names, new students can pick up where graduates leave off. If the standards can work in this environment, they can hold up in any business."

Key to Success

The key to the success of any documentation effort is its incorporation into everyday programming activity, Ellis said. If documentation is an ongoing procedure, instead of an afterthought, it takes less time and standards are more likely to be met.

"Program documentation is the most important and the most neglected category," he said. "Operations procedures can be copied directly from the program documentation for inclusion in a run book kept near the computer. Program documentation also provides a large share of the information needed in the system overview."

The best way to assure complete documentation is to make it a part of the source program by using in-line comments, Ellis believes. That technique ties the documentation directly to program coding and eliminates the possibility of misplacing necessary documents.

Programmers also are more likely to code documentation than they are to write it out later, and editing in-line documentation is easier.

In-Line Comments Pay

"Punched cards are not expensive and do not add significantly to program compilation or execution times or primary memory requirements," Ellis said. "When source programs are written and modified in an on-line environment, there is an argument that the comment statements take up secondary computer storage.

"However, I think that if people will only look realistically at the cost of secondary storage vs. the benefits of maintaining comments in an easy-to-edit form, they will find it pays to incorporate the comments in the source program."

Ellis developed a 20,000-line system last year in an on-line environment and was able to document it completely according to his strict standards. NCB uses a 128K-byte Corp. Century 151 with multiprogramming capabilities for the college's administrative applications and to support the academic program. A 512K-byte NCR 8430 Criterion is on order.

Students can work on program development at five on-line terminals or punch cards for data entry. NCB also has a minicomputer.

Seventeen Elements

Ellis listed 17 elements in his program documentation standards. These include program name; purpose; a brief system description (if the program is part of a larger system); program input, including record formats, monitor flags and reference to input files; data processing algorithms; output, including record formats, special form requests and carriage control tapes required; and a computer system configuration showing required peripherals and providing a disk file allocation table.

Subprogram usage and agruments; required subprograms and overlays; special messages; the run schedule; security procedures and special operating instructions; author and data; variable dictionary and data definitions; and, finally, documentation explaining each statement or set of statements used to perform a given program function are also part of Ellis' standards.

When this documentation is created at the same time as coding, it can pay substantial time-saving dividends in debugging and design efforts. "The English is there to help the programmer develop the program and provides a reference check for debugging and testing," according to Ellis.

Reviewing Documentation

"When the system reaches the maintenance and modification stage, the documentation can be reviewed to see how changes relate to the original system objectives. Documentation can then be updated at the same time the code is changed.

"Unfortunately, without these procedures, individuals sometimes begin changing lines of code without looking at the program plan even before the program is thoroughly debugged and tested with poor results."

In addition to the source code and documentation for each program, Ellis said system documentation should cover flow charts of system and program logic; a process flow diagram; samples of special input and output forms; record layout forms; job control cards; utility routine control cards; and a data deck for program testing, plus a sample of the correct output.

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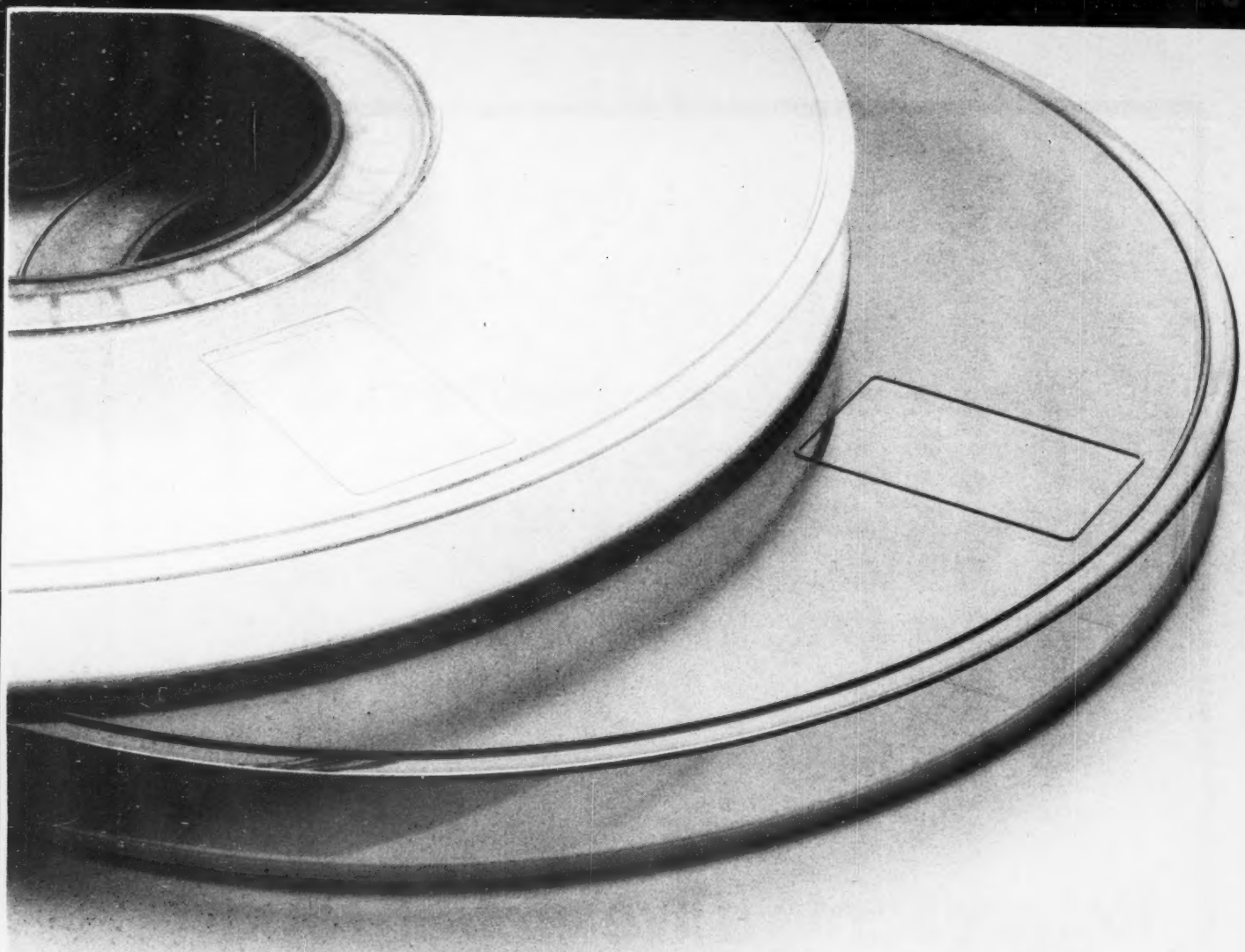

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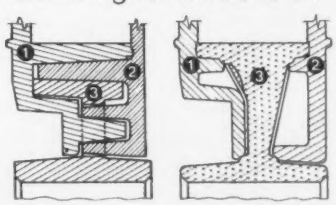

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Package Backs PDP-11 Transaction Processing

EDINA, Minn. — CCS-11 from Cytrol, Inc. combines data base and communications management to provide an efficient environment for transaction processing on Digital Equipment Corp. PDP-11s, according to a Cytrol spokesman.

Running under DEC's RSX-11M, CCS-11 can support 300 IBM 3270-type terminals in multidrop configurations. Multiple CCS-11 systems can be linked to form a network in which access to networks, data bases and processing tasks can be shared among processors, the spokesman said.

Remote printer output can be spooled or handled directly under user program control. A screen management facility for formatting and manipulation of field-oriented screen data is also provided.

The network-oriented data base management system (DBMS) allows multiple keys and supports symbolic retrieval, addition, modification or deletion of records and record relationships. Relationships between records can be described as key-indexed, hash-indexed or chained, the spokesman explained.

Layered Architecture

The package is said to feature a layer architecture that permits application access to various service levels within CCS-11 as well as full access to all features of RSX-11M. Application programs can be written in Cobol, Fortran, Basic, Pascal or Macro-11.

Any RSX-11M task — real-time, batch, program development or system maintenance — can be run concurrently with CCS-11, the company claimed.

The Cytrol package is available now for $30,000 for the first copy and at discounted costs for subsequent copies. Fifteen days of support and a year's maintenance on the software are included in the cost, the spokesman said from 4570 W. 77th St., Edina, Minn. 55435.

Pascal Ready For Eclipses Under AOS

PALO ALTO, Calif. — Developed from the University of Lancaster's RDOS implementation of the P4 standard of Pascal, a compiler is available now from Gamma Technology, Inc. for use on large-scale Data General Corp. Eclipse minicomputers running under AOS.

The combination of Pascal's "clear and structured approach to programming" and AOS' approach to resource sharing opens up many possibilities for on-line educational work and program development on a modest budget, a Gamma spokeswoman claimed.

Pascal under AOS can also shorten program development time in production or research facilities with rapidly changing demands, she said.

Gamma's compiler is said to be the first commercially available Pascal compiler for AOS users.

Gamma technology is distributing both source and binary code for the compiler on 9-track, 800 bit/in. magnetic tape for $300. The firm is at 2452 Embarcadero Way, Palo Alto, Calif. 94303.

'MRS' Offered On License Now

LYNBROOK, N.Y. — The Management Reporting System (MRS), a terminal-based inquiry language introduced last autumn [CW, Sept. 18] to run under control of IBM's CICS and extract information from DL/1 data bases, is now available on an annual license.

The package can now be acquired for $190/mo for 12 months or for $4,990, according to the vendor, Infopac Associates, Inc., P.O. Box 591, Lynbrook, N.Y. 11563.

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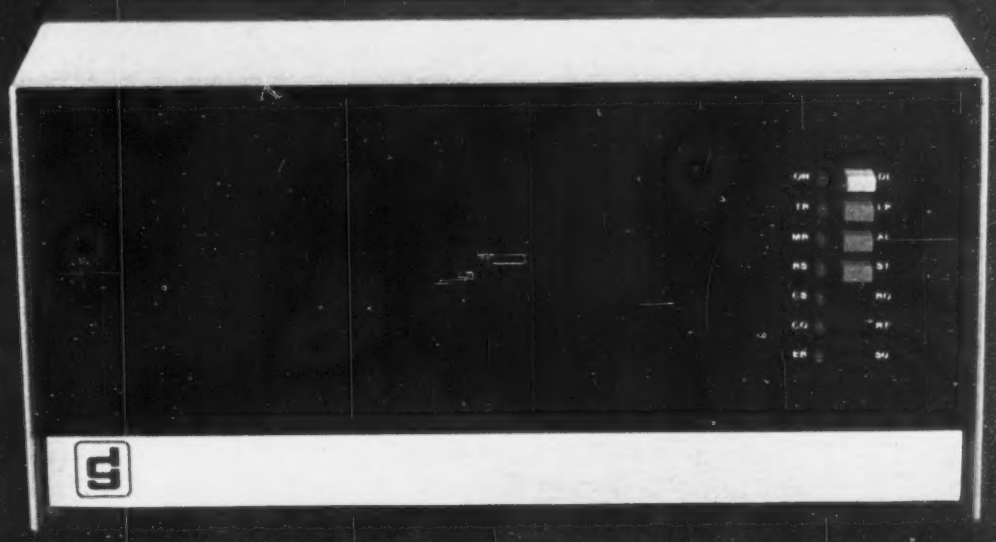

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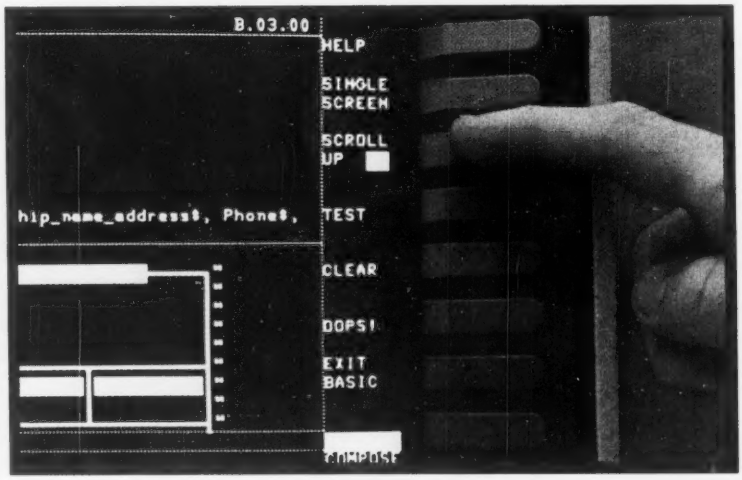

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AMIGO/300 supports two business languages—RPG II and BASIC. And the system can grow from its built-in 12 megabyte fixed disc to 260 megabytes of disc storage.

For all its big system capability, the HP 300 is remarkably simple to program and operate.

Its integrated display system (IDS) has eight soft keys at the right of the screen. These can be programmed to lead the user step-by-step through each job.

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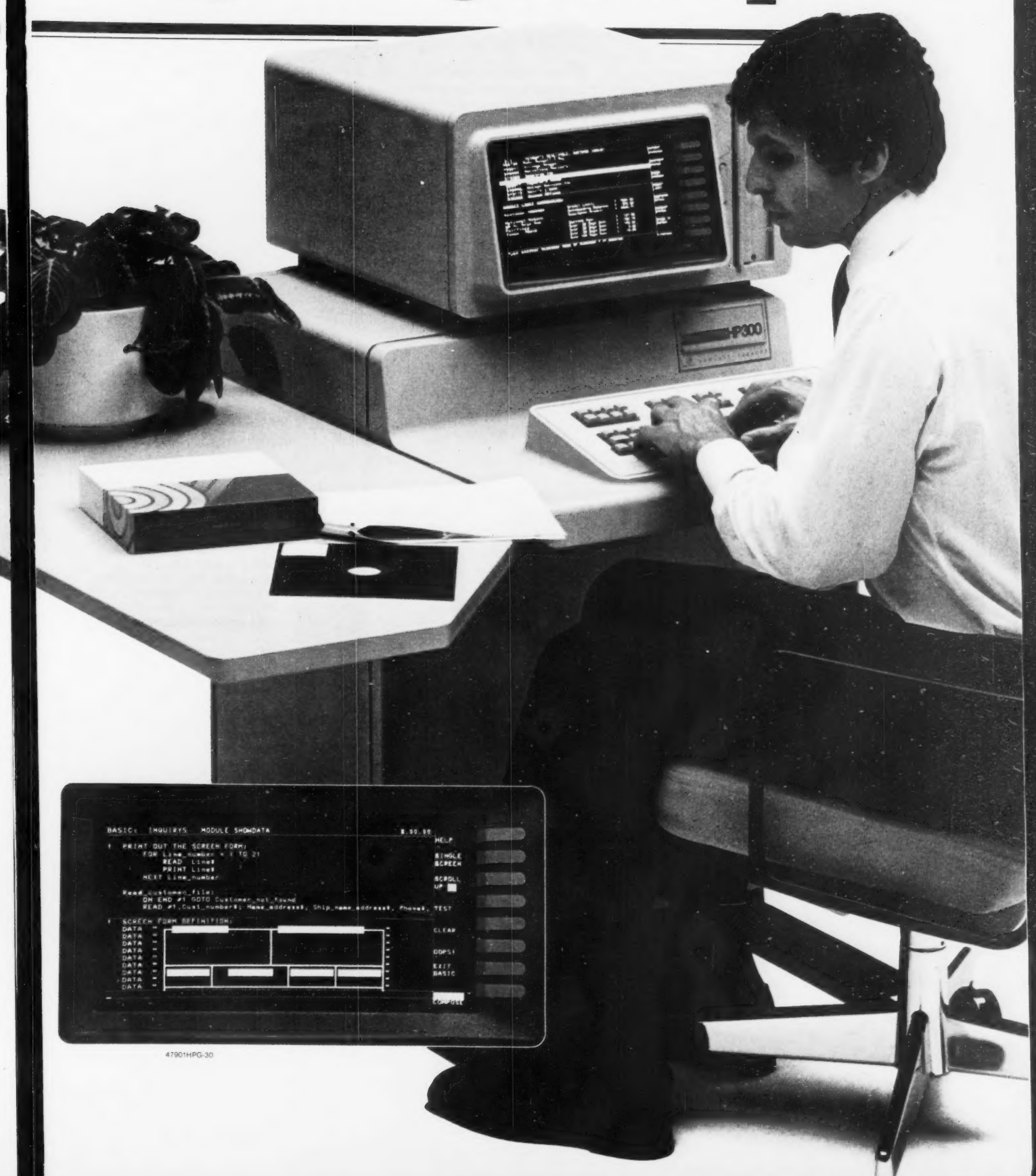

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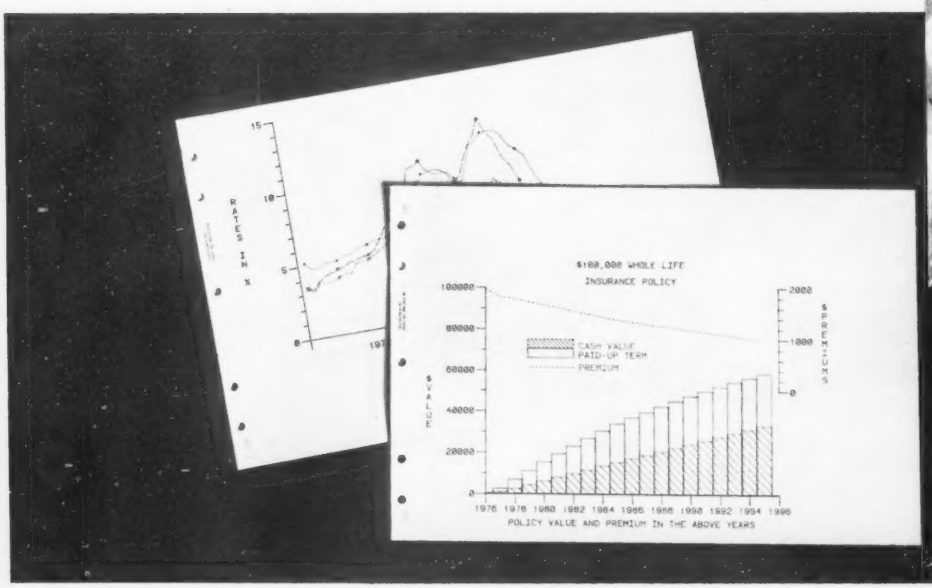

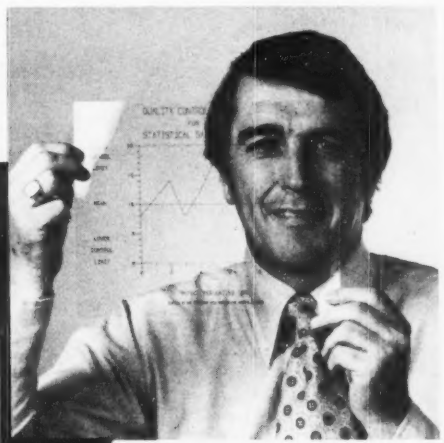

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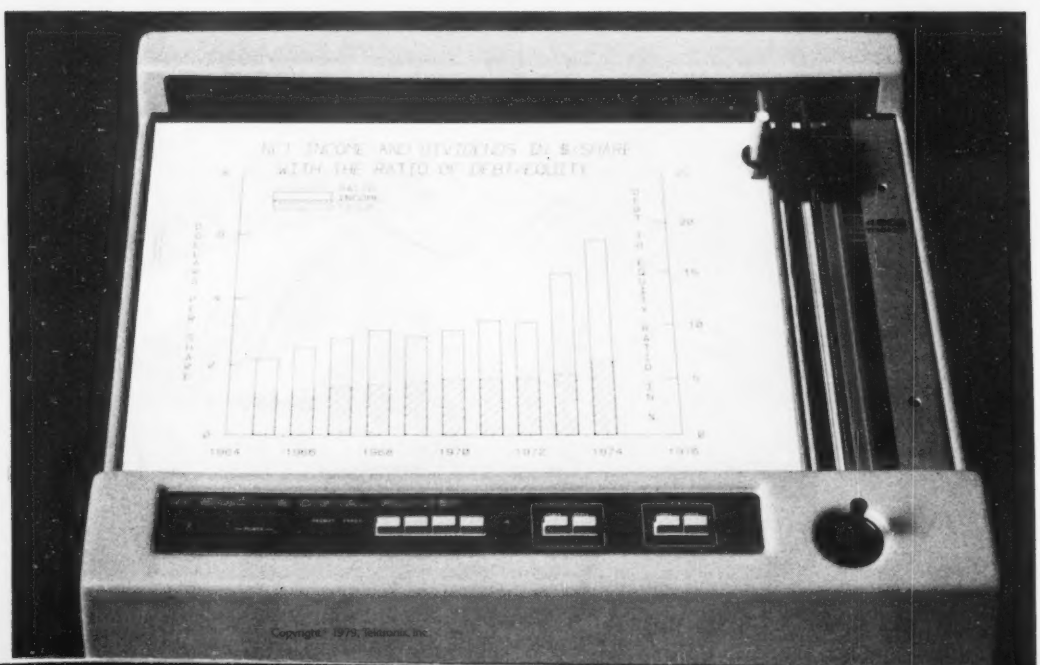

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Seminar Speakers Agree:

One Net Not Enough for Tomorrow

By Ronald A. Frank
CW Staff

WASHINGTON, D.C. — It is doubtful that the network needs of the average user will be met by any single communications network being planned or now in operation.

That was the consensus of opinion among speakers at a recent seminar here on "Tomorrow's Networks" sponsored by Technology Transfer, Inc.

James Martin, a recognized author and lecturer, said users will have to formulate discrete in-house strategies to handle voice, data, electronic mail and other functions. Since a variety of network offerings will be available, users will have to set their own standards within the corporation, based on what will solve the needs of the individual firm.

Most companies will settle on a combination of public and private network facilities as the best solution to their telecommunications requirements, Martin said.

The user will have to analyze its corporate needs and, based on these findings, make a decision on the proper mix of network services, he advised. As companies shift into a distributed data processing (DDP) environment, such problems as incompatible terminals, little uniformity in network standards, high maintenance costs and bad security will have to be faced. "When you decentralize, the pieces have to fit together," he warned.

Questions Need Answering

Among the questions that must be answered, Martin said, are which department will be responsible for application software development, who will design the data base and where will it reside, what standards will be adopted, who will be responsible for hardware and software selection and how the central DP site will interact with remote DP groups. Once these types of determinations have been made, then various network options can be considered.

Defining each corporate need as a zone, Martin said certain zones will require IBM's Systems Network Architecture (SNA); others may need AT&T's Advanced Communications Service (ACS); and still others might draw on Digital Equipment Corp.'s Decnet as solutions.

Each of these approaches serves its own needs. For example ACS "stops at the central office, while SNA goes directly into the CPU," he noted. Which system is best depends on the user's requirements.

When performing their analyses of avail-

(Continued on Page 56)

PIX II Virtual Data Link Adapted for Low-Volume User

LARGO, Fla. — Paradyne Corp. has introduced a remote control unit for use on PIX II virtual data links in a package that also includes IBM 3270-type interactive terminals and a character printer.

The configuration brings PIX II capabilities to users with lower volume data communications requirements, according to a spokesman.

The upgrade includes improvements in response times at interactive terminals, the ability to operate multiple types of devices over a single data communications line and the ability to implement IBM's full-duplex Synchronous Data Link Control (SDLC) protocol without teleprocessing software, he said.

A basic virtual data link includes a Local Control Unit (LCU), which attaches directly to the mainframe byte multiplexer channel, and one or more Remote Control Units (RCU) to which peripheral devices are attached.

Contents of Package

The low-cost configuration package consists of a Mini Remote Control Unit

(Continued on Page 56)

Harris Users Get SNA/SDLC Emulation

DALLAS — A software emulator from Harris Corp. is said to make the 1600 remote batch terminal series compatible with IBM's System Network Architecture (SNA) and its line discipline Synchronous Data Link Control (SDLC), including Multiple Logical Unit (MLU) capability.

Called the EM3777, the emulator will allow Harris 1610 and 1620 remote batch terminals to simulate the communication capabilities of IBM's 3776 (models 1, 2, 3 and 4) and 3777 (models 1 and 3) terminal systems.

The EM3777 is said to support up to 10 logical units and simultaneous communications with up to five host mainframes in SNA/SDLC mode, operating at speeds of 2,400-, 4,800-, 9,600- and 19.2K bit/sec.

Emulator Operation

The Harris SNA emulator operates as a single job under the 1600's Communications Operating System, a feature not provided by IBM on the 3776 or 3777, the spokesman said. The operating system can support multiple jobs concurrently, including other remote job entry (RJE) protocols.

The SNA protocol can run concurrently in a single 1600 with Hasp multileaving or other binary synchronous protocols. This feature provides a significant advantage for users installing SNA that wish to continue to use existing bisynchronous equipment and application programs during a conversion period or for extended parallel operations, Harris claimed.

Protocols available on the 1600 now include IBM's SNA/SDLC (3777), Hasp multileaving, 2780, 3780, 3741 and 5230. Other protocols supported by Harris equipment include Univac's 1004 and NTR; Control Data Corp.'s 200UT; Honeywell, Inc.'s G115/355; and Burroughs Corp.'s DC1100. The emulator software carries no charge, the firm said. Harris is at 16001 Dallas Parkway, Dallas, Texas 75240.

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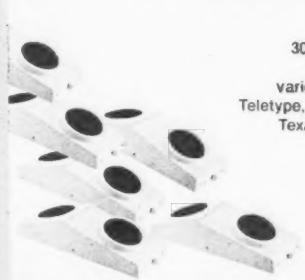

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Users Predicted to Need More Than One Net

(Continued from Page 55)

able options, users should be aware of current economic parameters. For example, electronic mail is already less costly than regular mail, Martin said.

Aspects of SBS Service

Another speaker at the seminar, C. Thomas Rush, manager of applications development at Satellite Business Systems (SBS), described the type of service SBS will offer. Users will operate on SBS with integrated voice, data and image nets that will have variable data rates and be assigned on-demand capacity.

Access will be from earth stations on customer premises, and the network will operate in the 12 and 14 GHz frequency band, Rush noted. The service will be best suited to private-line voice, low-speed data, high-speed facsimile and "televisual" communications, he said.

William Smith, who is in charge of service management for new network systems at AT&T, told attendees that ACS will use the CCITT X.25 network standard for packet switching, but Bell will define "how certain capabilities are used in the network." He implied that the ACS version of X.25 may be somewhat different from the adopted standard.

While users will continue to have a mix of private and public nets, ACS will be particularly suited to interorganizational usage. Smith said that from the user's standpoint, it is more important what ACS can do than what it will cost.

The network service will put more control into the user's hands and will feature low start-up costs, thus appealing to the smaller user, he said.

Next Generation

Lawrence Roberts, chairman of Telenet Communications Corp., said the next generation of packet-switched services will include broadcast mode and the capability for users to set up conference calls among CPUs. Remote batch transmission will be effective on packet nets only when no local loops are involved. This will require network concentrators to be installed directly at the user site, he predicted.

Mixed voice and data traffic will become feasible on packet nets in the 1980s. Interactive traffic will not be cost-effective on satellite links mainly because of labor costs.

Telenet studies showed that satellite delay will cost a significant portion of an operator's salary. But bulk data transfers will be effective on satellite links. Although it is inevitable that voice traffic will be handled on packet nets, it is not yet clear whether this type of transmission in the form of digitized voice will be most cost-effective on terrestrial or satellite facilities, Roberts said.

PIX II Adapted For Small User

(Continued from Page 55)

(MRCU), from one to three 3270-type interactive terminals and a 100 line/-min printer. Optional attachments are a 300 card/min reader and a diskette drive.

Network Expansion

Multiple MRCUs and RCUs can be attached to the same LCU, according to the firm. The MRCU is said to be designed for current PIX II customers who are expanding their networks with additional links and for others who are now considering standard remote terminals or low-cost distributed processing systems.

The standard PIX II RCU provides features for users requiring communications links from remote locations to IBM 360, 370 or 300 series mainframes.

These users may also have lower volume requirements at other locations such as sales offices or regional warehouses.

The MRCU offers the large data base advantages of on-line operation at a cost approaching that of remote batch transmission, the spokesman claimed.

Lease prices for the MRCU/terminal packages start at $486/mo., maintenance is additional. Deliveries are scheduled to start in the second quarter.

Paradyne Corp. is at 8550 Ulmerton Road, Largo, Fla. 33541.

indatagestion!

A special report on Source Data Entry in our April 23rd issue.

We've come a long way since the days when banks of keypunch machines in climatically controlled office buildings accounted for the vast majority of all data being entered into the world's computer systems.

Everywhere you go today there are new data entry devices — from bar codes to light pens to intelligent terminals to hand-held data recorders. And that's what we'll be looking at in our April 23rd special report, *Source Data Entry*.

Edited by Tim Scannell, this report will take a look at the state of the data entry art, new methods of data entry, predictions for future changes, and unusual or interesting ways in which computer users have solved various data entry problems.

In addition, the report will include some tips on saving money — how to ingest more data for your dollar — and some new ideas on updating old data entry systems.

All-in-all, it should be very interesting reading if you have anything to do with gathering data. And if you're marketing a product or service in this field, this special report is a very good place to spread the word with your ad. Call your *Computerworld* sales representative, or Terry Williams at (617) 965-5800. Ad close is April 6th.

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DP Dialogue

Notes and observations from the IBM Data Processing Division that may prove of interest to DP professionals

VSPC Helps Portland General Electric Make Planning Decisions

The cost of energy is rising steeply for Portland General Electric Company, which supplies electric power to the Portland area in northwest Oregon. Now that the region's potential for hydroelectric power has been fully utilized, and the company must develop higher cost sources, planning with the aid of computerized modeling is helping PGE to control costs and conserve capital.

"VSPC made the computer directly available to our professional people just when they needed it most," says Keith Parkyn, Manager of Data Services. Engineers, financial planners and programmers all use Virtual Storage Personal Computing (VSPC) to interact directly with an IBM 3032 Processor through 50 terminals in many PGE locations. With the aid of mathematical models of the utility and its power distribution system, they plan construction projects, analyze power flows, and examine operating contingencies.

"Some of these programs produce massive tabular output," David Kruse, Supervisor of Technical Systems, points out. "And we often require several runs of a model to obtain a useful one. With VSPC, the engineer can look at the results in the terminal display – and, if he likes, vary a parameter value and repeat the run before taking any printout."

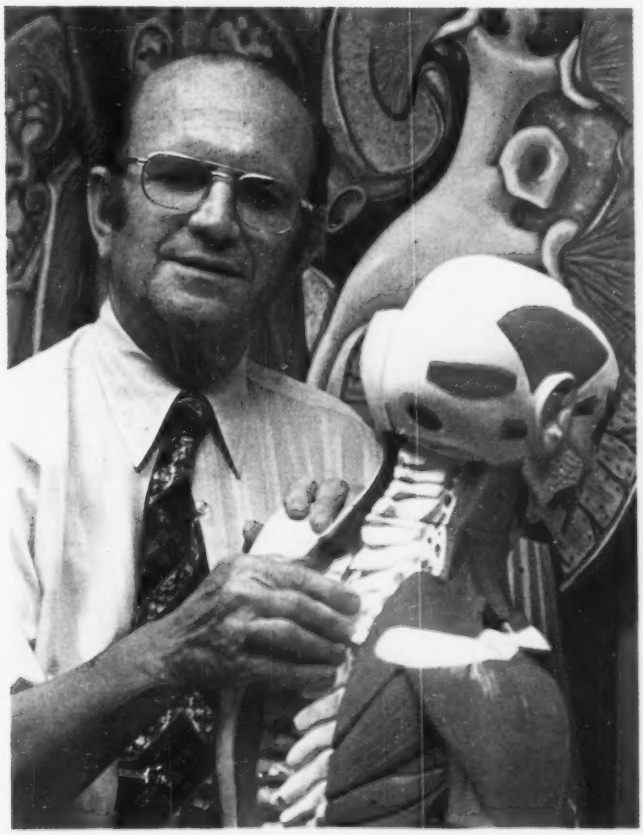
VSPC has easy access to the corporate data base: planners who need data on power usage, financial history, or the like, can run programs against the existing files, usually with no data entry services at all.

Energy Control Center at Portland General Electric. A technician uses a tag to make a notation on the automated "mimic board," which graphically represents the sub-transmission system.

A user can get as many as 10 "turnarounds" a day, if the situation dictates, under VSPC, compared to two a day at best under batch, Kruse notes. And he can submit work to the batch queue, selecting his priority in terms of his needs. If he can accept overnight turnaround, for example, the charge to his project is very low. "Enabling people to submit these jobs remotely, through VSPC, relieved the operators of a real burden," he adds.

"VSPC has enabled our programmers to get a huge maintenance programming backlog under control," Parkyn continues. "Today we keep this backlog at about 1,800 man-hours, which is where I want it, to assure a steady workload. User complaints have about disappeared."

Much of the application programming at PGE is under the Customer Information Control System/Virtual Storage (CICS/VS), for online business systems, Parkyn explains. "Using VSPC, a programmer can write or change a CICS/VS routine at a terminal and then test it immediately at the same terminal," he says. "It's not uncommon to have 25 people logged onto VSPC at once."



Helping Teachers Teach at U. of Evansville

There's a teaching aid at the University of Evansville, Indiana, that's available morning, noon and night, seven days a week. It's the university's computer, which is helping students of nursing, medicine and other health-care specialties in three of their courses covering the human body and how it works.

A student taking anatomy and physiology, for example, can work at a computer terminal in the Computer Assisted Instruction Lab – typically in ten review sessions per school term, of about 50 minutes each. Dr. William Snively, who directed the development of the learning system, emphasizes that computer-aided instruction is one of six carefully integrated modes of study at the university. The five others are lectures, classroom work, textbook study, laboratories and other programmed instruction including written and audio/visual programs. Each has its own advantages in helping students keep their interest up, while meeting the demands of a heavy workload.

During a study session, the IBM System/370 poses questions that the student answers by typing at the terminal keyboard. "The questions and answers are designed so the program can distinguish whether a wrong answer, in context, is an educated miss or a wild guess," Professor Snively notes. "And the system responds accordingly: 'You're almost right but here's a point you missed.' Or: 'Where were you last night?'

"Because these are undergraduate students, we've used humor and informal language in the system responses, and the computer addresses each student by name. In addition to making a session more enjoyable, this also makes for more productive involvement by the student.

"We don't require anyone to use the computer," Snively says, "but 50 percent of the students do so voluntarily." One course on acid/base disturbances, which deals with changes in the chemistry of body fluids, is a systematic coverage of the subject. Those for anatomy/physiology and patho-physiology are computer-assisted reviews. All three were adapted from programmed learning texts by Scott Kincaid of the university's data processing department.

The computer keeps track of each student's performance and reports on progress to the student and to the instructor. However, the computer score never goes into the student's grade or record.

"It seems that everybody benefits from this system," notes Snively. "The constant use of the terminals, 15 in all, attests to its popularity with the students. And it lets us make better use of our time in preparing material and meeting personally with students who have a particular question or problem that they have trouble understanding."

Dr. William Snively was the moving force behind the development of computer-based learning aids for medical and health-care subjects at the University of Evansville.

DP Dialogue is designed to provide you with useful information about data processing applications, concepts and techniques. For more information about IBM products or services, contact your local IBM branch office, or write Editor, DP Dialogue, IBM Data Processing Division, White Plains, N.Y. 10604.

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Teletype 43 Available On Lease From RCA

CAMDEN, N.J. – RCA Service Co. has added Teletype Corp.'s 30 char./sec Model 43 impact printer to its leased equipment line of data communications terminals.

The Model 43 is available in receive-only (RO), keyboard send/receive (KSR) and buffered send/receive (BSR) configurations and is compatible with Teletype's Model 33 terminal.

The unit offers operator-selectable half- or full-duplex operation, a multicopy capability, dot matrix impact printing, Ascii upper and lower case characters and built-in diagnostics, a spokeswoman stated.

The BSR model has a 20K-byte internal character memory with a microprocessor base and can attain speeds up to 1,800 bit/sec.

Leasing prices for the RO and KSR terminals are $54/mo and $58/mo, respectively, on a five-year contract. The BSR unit with a 4K-byte memory leases for $102/mo, the spokeswoman said from the firm's Cherry Hill Offices, Camden, N.J. 08101.

Report Details 'Digital Future Of Telephone Net'

MILLBURN, N.J. – Although much attention is presently being given to the "digital future" in communications, a number of recent AT&T developments and policies make more difficult the realization of an integrated digital network.

This is one of the major conclusions of a 144-page study conducted by Probe Research, Inc. entitled "The Digital Future of the Telephone Network." Said to rely heavily on documentation, the study tackles AT&T's policies, new carrier systems, specialized networks and fiber optics and highlights possible traps for independent suppliers of communications equipment.

The report also contains a detailed background analysis of the evolution of analog switching and transmission technology and how it interacts with digital technology, the publisher stated.

The study costs $150 from Probe Research through P.O. Box 251, Millburn, N.J. 07041.

Adcu Meeting Set June 24-27

KIAMESHA LAKE, N.Y. – The Association of Data Communications Users, Inc. (Adcu) will hold its 1979 National Meeting and Seminar on June 24-27, at the Concord Hotel and Resort here.

Adopting the theme "Information Management," the seminar will address subjects such as "Intergration of Telecommunication Techniques" and "Telecommunication Organization – How to Deal With Your Environment."

Further information on the meeting can be obtained from Adcu, P.O. Box 1184, New York, N.Y. 10019.

CRT Terminal Offered As Substitute for VT-52

MALDEN, Mass. – Dataview, Inc. has unveiled a CRT terminal offering switch-selectable transmission rates of 75- to 9,600 bit/sec that is compatible with Digital Equipment Corp.'s PDP/8, PDP-10, and PDP-11 processors.

The Monarch-52 can operate in half-or full-duplex modes and interfaces with 20ma current-loop or RS-232C systems, according to a Dataview spokesman. The unit has a 1,920-character screen with 24 lines of 80 char./line and features full cursor control – up, down, right, left, tab and erase display from cursor position to end of line, erase to end of screen and absolute positioning.

Designed as a replacement for DEC's VT-52 CRT terminal, the software-transparent Monarch-52 has a 128-character Ascii set and a 19-key keypad. Extended commands are supplied via an escape sequence, the spokesman said.

The Monarch-52 is priced at $1,360 from Dataview at 23A Dana St., Malden, Mass. 02148.

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Includes Portable Cable Tester

IDS Adds Control, Monitoring and Test Units

LINCOLN, R.I. — International Data Sciences, Inc. (IDS) has announced a series of data communications control, monitoring and test equipment ranging from a portable EIA cable tester to an analog signal generator and monitor.

The Model 8580 cable tester indicates opens, shorts and miswired conductors in EIA 25 connectorized cables through three red LED lights located on the unit's front panel. The device can test cables up to 50 ft in length and can accommodate cables with either male or female connectors at either end.

Powered by a long-life dry cell or optional ac adapter/charger unit and rechargeable batteries, the Model 8580 has a 25-position switch to test each of the pin connectors on a standard EIA cable. It is priced at $395.

Bit Error Rate Tester

Composed of two independent testing units, IDS' Model 65/60 was designed to determine the bit error rate of synchronous and asynchronous data communications systems, multiplexers and modems. The unit contains both a data transmitter and receiver and is reportedly capable of analyzing any digital transmission system.

The 65/60 transmitter generates six data patterns continuously under the control of a pattern switch, with special repeating sequences standard. The receiver section generates a true replica of the transmitted data and compares this replica with received data, a spokesman explained.

In addition to detecting and tallying bit errors, the unit produces a steady all-mark received pattern which detects, tabulates and displays mark-to-space and space-to-mark transitions, he said.

Tests can be performed on either end-to-end or loopback configurations, the spokesman added.

The EIA breakout panel portion of the Model 65/60 provides access to all 25 conductors of the EIA RS-232 interface between the terminal and the modem.

The 65/60 is priced at $850, excluding an optional battery charger that costs $20.

Test Set and Printer

The Model 3000D data transmission test set is structured for high-speed synchronous testing of data communications channels and includes built-in RS-422, V.35, RS-232, MIL 188, total seconds, errored bits and total bits testing switches, as well as a 65,535-bit pseudo-random test pattern facility, according to the spokesman.

The unit operates in simplex, half-duplex or full-duplex modes up to 5 MHz and has 10 LEDs that monitor key interface signals. In addition, proprietary techniques allow fast loss-of-sync detection within 20 bits — which does not affect the error count — and an internal clock aids in external timing, the spokesman said.

The Model 2900D data test set printer works with the 3000D to create a record of data test results.

Printouts of the four 3000D event counters can be initiated at preselected time intervals or programmed to occur when the interface signals exhibit transitions.

The time of sync loss and recovery can also be recorded by the user. The printer is priced at $3,220.

Audio Monitor

IDS also unveiled an audio generator and monitor, the Model 8508, that allows the operator to listen to and measure received analog signals appearing at the modem-telephone line interface.

The unit generates a variable signal which can be patched into a telephone line to determine line losses. It has an audio speaker linked to a meter that measures weak line signals.

A front-panel switch allows either the input or output signals to be monitored by the meter and speaker, the spokesman said.

The portable Model 8508 is priced at $810; a rack-mounted version costs $730.

Additional information on IDS' data communications products is detailed in a 166-page catalog published by the firm. The catalog includes a section of articles on the fundamentals of technical control diagnostics.

The catalog is free from the company at 7 Wellington Road, Lincoln, R.I. 02865.

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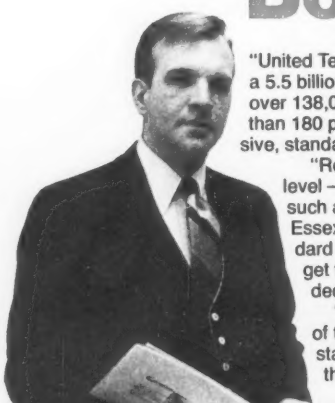

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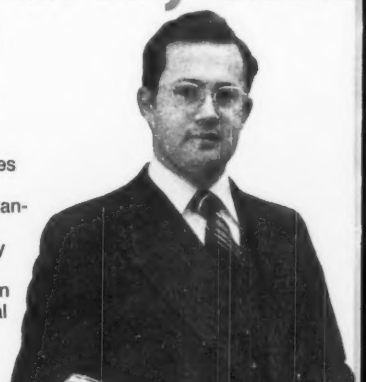

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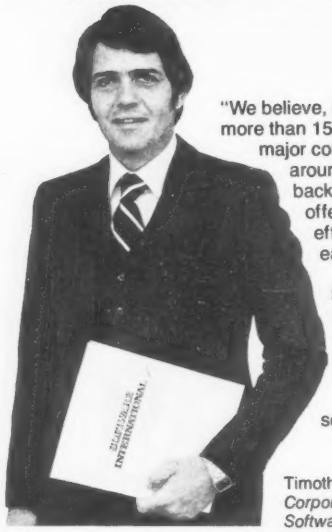

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Siemens Adds Terminal

ISELIN, N.J. — A microprocessor-based terminal, unveiled by Siemens Corp. for its T-1000 electronic Telex or PT-80 TWX/direct dial-up printer, incorporates a single-sided diskette system with a 200K-character storage capacity for word processing and other intelligent functions.

The Micro-Disk terminal uses either Ascii 8-level or Baudot five-level code. It can be field-installed.

Using the terminal, an operator can compose and edit copy in solid-state memory and then transfer the message to disk for transmission; recall messages and retransmit from disk storage under keyboard control; and conduct two-way communications at speeds up to 9,600 bit/-sec on the eight-level machine and 2,400 bit/sec on the five-level terminal, a spokesman noted.

The terminal also allows users to obtain formats automatically through the use of standard pre-stored formats on the disk and to precode the disk so unauthorized users are barred from accessing the terminal.

The Micro-Disk operates at switch-selectable transmission speeds ranging from 50- through 9,600 bit/sec, depending on the data code used, and is powered by normal house currents, Siemens said.

The terminal is priced at $1,895 from Siemen's Data Communications Division, 186 Wood Ave. South, Iselin, N.J. 08830.

APL/Ascii Terminal Offers 32 Programmable Functions

MINNEAPOLIS — The ability to store up to 32 programmed editing and control functions as well as a character-reviewing "instant replay" facility are featured in an APL/Ascii CRT terminal introduced by Research, Inc.

The Teleray Model 11 can be used in conventional interactive character mode or in block mode for editing and forms filling. In APL, the unit displays all APL characters and overstrike combinations, including alphanumerics; when sequenced into Ascii, it displays 96 Ascii characters, a spokesman stated.

The unit's forms, answerback and control sequences total more than 500 characters. Programmable features include a normal/wide character format, independent I/O and peripheral speeds, cursor position read/write and up to 16 columnar tabs.

The terminal also has protect, dim, blink, inverse video and underline field modifiers, the spokesman noted.

In addition, the Model 11 can be serviced by mail since it uses a series of snap-in modules, the firm said.

The Teleray Model 11 is priced at $1,590 from Research, Inc. at P.O. Box 24064, Minneapolis. Minn. 55424.

Vista/80 Works As Controller Or Concentrator

MOUNTAIN VIEW, Calif. — Incorporating a multiple-processor architecture and aimed at systems linking 100 or more terminals, a terminal controller has been introduced by Microform Data Systems to function either as an intelligent clustered CRT/keyboard controller or as a store-and-forward data concentrator.

The Vista/80 will support up to 18 CRT/keyboards or a combination of CRTs and printer devices. Its modular design facilitates changes in network functions, protocols and terminal devices, according to a spokesman.

As a data concentrator, the Vista/80 attaches to host computers through one or two 9,600 bit/sec lines and supports up to eight 9,600 bit/sec. circuits on the downline side. Batch and interactive operations can be handled concurrently, and the unit can simultaneously access multiple host computers, the spokesman said.

The Vista/80 ranges in price between $6,000 and $15,000, depending on user configuration. Microform Data Systems is at 830 Maude Ave., Mountain View, Calif. 94043.

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Manager of Financial Services
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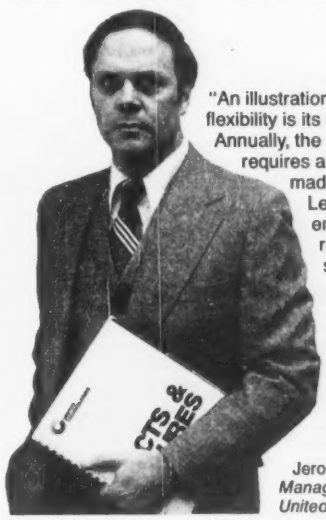

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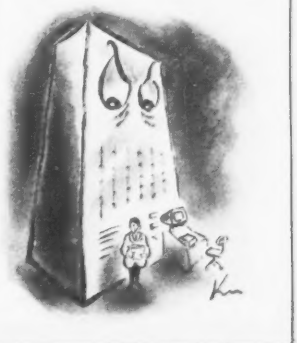

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RJE Terminal Offers IBM 2780 Communications

PALO ALTO, Calif. — Tab Products Co. has introduced a remote job entry (RJE) terminal that combines keyboard entry features with transmission capability.

Called the System 700-60, the terminal is available in single- and dual-keystation configurations. The basic system includes a keyboard display with diskette storage. An optional line printer is available.

Binary Synchronous Communications in IBM 2780 format can be added to the system to allow transmission of data at speeds up to 9,600 bit/sec, according to a spokesman. Data can be transmitted or received in single records or with expanded communications of 400-character blocks, he noted.

The single-station system costs $138/mo or $4,950 purchase. The double-station unit costs $160/mo or $5,400. Maintenance is $42/mo and $52/mo. The 2780 interface costs $60/mo or $1,400 with $15/mo maintenance.

Monthly prices are based on one-year leases, but longer terms are available. The 2780 feature can be added in the field.

The optional printer, which costs $162/mo or $5,100, requires an interface for $30/mo or $1,000.

Tab Products is at 2690 Hanover St., Palo Alto, Calif. 94304.

Cost Models Recommended As Way to Choose System

DALLAS — Choosing the right corporate telecommunications system at the lowest cost requires an in-depth cost analysis technique that relates cost to system performance and that accounts for *all* costs in the system's life cycle — from installations to retirement, according to telecommunications specialists at Booz, Allen & Hamilton, Inc.

Addressing a recent telecommunications conference here, Jay E. Pultz, a senior managing associate, explained that Booz, Allen has adapted military cycle costing to commercial systems by taking into account corporate economic factors, such as tax credits.

"This technique provides a much better understanding of what factors are really driving a particular system's cost. Except for extremely simple systems, it is usually not possible to accurately estimate costs for the system as a whole," Pultz said.

Much more precise estimates are possible by breaking down the system into component parts and estimating the cost for each component through cost models, he believes. The telecommunications planner can then identify what must be done to reduce costs, and the results can mean substantial savings over the system's life cycle.

"Many costing techniques utilize ballpark estimates, rules of thumb or quickie estimates to develop the cost of components or even systems," Pultz noted. "Modeling is a more rigorous approach, and these cost models relate the basic system parameters so tradeoffs between performance, requirements and cost can be evaluated."

Pultz defined a good cost model as one which "reflects the state of the art, relates cost to system parameters and has a specified accuracy and range. This type of model is the key to performing life-cycle cost analysis."

Once the three major elements of the system are broken down into cost models, corporate economic factors such as depreciation, tax credits and the rate of inflation are taken into consideration in order to develop total net costs. This is reduced to a net present value, Pultz said, and the result is a much more accurate cost estimate.

This technique portrays cost as a function of users' basic requirements — such as the number of data circuits needed. This cost relationship is usually eye-opening to a communications manager and may lead to a reassessment to determine if all those circuits really are required, he said.

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SANTA ANA, Calif. — A minifloppy disk terminal designed to attach between existing Ascii printer/CRT terminals and their RS-232 modems is available from Western Telematic, Inc. (WTI).

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Special Report

DATA COMMUNICATIONS TERMINALS

SOARING TO NEW HEIGHTS

Edited by Ronald A. Frank
March 26, 1979

As Installed Base Skyrockets

General-Purpose Terminals Seeing Wild Times

By Ellen Rogers
Special to CW

Like Wild West boom towns of yore, terminal markets today are raucous. Fantastic growth provides opportunities for the fast-draw artists, range wars between nesters and ranchers flare up and change is the order of the day. And from all indications, it will be a while before the wild and woolly territory will be tamed.

While more than three million terminal device keystations are in place today — most of them general-purpose, with an average of eight keystations for every mainframe, minicomputer or small business computer in the nation — by the start of 1984 there will be almost seven million installed, according to International Data Corp. (IDC).

This doubling of the number of terminals installed in the U.S. will have its reverberations: some categories will outgun others, and suppliers not fast enough to address the new opportunities will fade.

And some of the most significant changes will take place in the general-purpose terminal area, since it represents three-fourths of the total market. The other major area is that for industry- or application-specific terminals such as point-of-sale, funds transfer and stock quotation terminals.

Historically, general-purpose terminals have fallen into two major categories — machine-oriented and operator-oriented. Examples of the former are optical character recognition (OCR) and remote-batch terminals, and the latter area includes keyboard printer terminals, "smart" or processing terminals and the ubiquitous CRT terminal of the IBM 3270 type.

Component Subsectors

To understand the general-purpose terminal area, one must look to the component subsectors:

• *Machine-oriented terminals* include both hard-wired and programmable remote-batch terminals, the IBM 1050 and OCR devices. It's a market on the 'wane. Already hard-wired remote-batch terminals such as the IBM 2780 and 3780 are no longer being marketed, and even shipments in the programmable versions, like the IBM 3776 and Data 100 Corp. units are losing ground.

But all is not lost. The equipment that is out there has a longer-than-usual lifespan, and retirements of products are not nearly as rapid as one might suspect. In addition, the OCR portion is rising — enough so the whole machine-oriented terminal industry will see a slow 4% growth in installed units by year-end 1983.

• *Key-to-storage terminals,* part of the operator-oriented category, are also on the wane, primarily because keypunches fall in here. Although rumors of the keypunch's imminent demise have always proved false, key-to-disk and key-to-diskette sales will nevertheless hasten the keypunch sunset. And as more sophisticated data entry devices — with more processing and more communications — replace key-to-disk units, this market will further erode.

• *Keyboard-printer terminals,* characterized by teletypewriters in the conversational mode and IBM 3767s and 3770s in the editing mode, are more progressive. But the healthy shipments of this subsector will be outpaced by those of other sectors — and by year-end 1983, these installations will drop from one-fourth to one-sixth of the total terminals.

The real bright spot in this subsector will be portable terminals, which are increasingly popular and less susceptible to replacement by CRTs.

• *CRT terminals* are the real rowdies of boomtown. Every major vendor of CRT terminals told IDC that 1978 was a record year, and IDC data files reflect the trend. Conversational CRTs, or "dumb" terminals, editing IBM 3270

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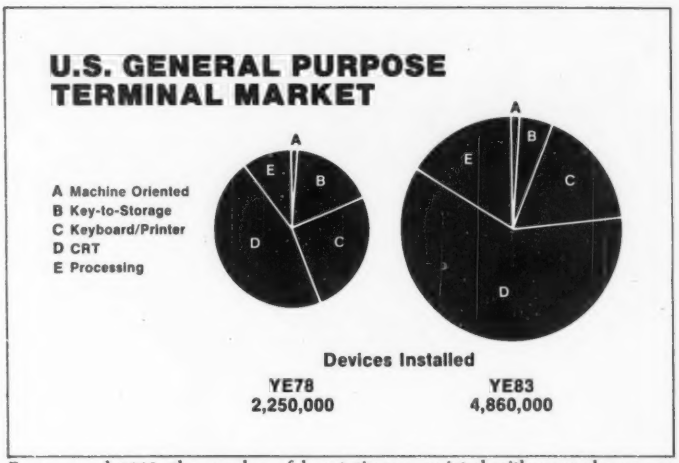

By year-end 1983, the number of keystations associated with general-purpose terminal devices will number almost five million. Other terminals will number almost two million. The fastest growing sector is CRT terminals.

Boost Troubleshooting Ability

TCUs Enhance DP Center's Flexibility

RESEARCH TRIANGLE PARK, N.C. — When Triangle Universities Computation Center installed a terminal control unit (TCU) here in 1970, the organization was well aware of the unit's cost and operational advantages.

"What we didn't realize was that we can troubleshoot and repair the box ourselves, a capability that allows us to quickly determine whether a communications problem is occurring at our end or at our user's end," John Stephenson, associate director and vice-president of the center, said.

The computation center offers time-sharing and remote job entry services for a wide variety of DP tasks to a large number of educational, commercial and government customers in North Carolina and neighboring states. While the largest educational users are North Carolina State, Duke University and the University of North Carolina, some 50 smaller colleges and educational institutions also use the facility.

Approximately 700 terminals access the center through a variety of techniques: dial-up and leased lines, multiplexers, microwave and so on. Of these, approximately 400 to 500 users access the system through the Memorex Corp. Model 1270 TCUs.

"We started out with one 1270 replacing our IBM 2703," Stephenson said, "but as soon as we reached its capacity, in 1973, we added another. We had considered intelligent front ends, but we just couldn't beat the 1270's price/performance. The controllers offered us capabilities that were simply not available on competitive equipment, though we did later add an intelligent front end for other purposes."

Users of the center's system have available to them two IBM 370/165s with 4M bytes of memory each and with one dynamic address translation unit. The system is configured with 13 tape drives, 50 3330-11-type disk drives of 200M bytes each, nine IBM 2314 disk drives on which some 500 packs are mounted and one high-speed printer.

Each of the two 1270s allows up to 96 lines to be connected simultaneously. The center has an additional TCU that handles about 20 lines.

"In essence, our clients can use the system in just about any way they see fit," Stephenson noted. "The system supports a wide variety of terminals, from small CRTs to full-function CPUs acting as terminals. Some users have IBM 360/75s, 370/138s, Itel Corp. AS/4s and other large mainframes linked with our system as though they were terminals."

The system — which runs under MVT Hasp and TSO, and which offers SAS, SPSS and QED (a TSO editor that the center wrote and markets) — is up 24 hours a day, seven days a week. All transmissions come into one mainframe and, when necessary, are

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Service Speeds Up Shipping Brokers' Messages

IJMUIDEN, The Netherlands — The Royal United Shipping Agencies — Koninklijke Verenigde Scheepsagenturen (KVSA) — now offers ship brokers a Telex service using minicomputers and teletypewriters.

When a chartering ship broker in Copenhagen wants to inform his 40 correspondents throughout the world about a cargo that has been offered, he sends the message by Telex to the KVSA Telex computer system and within five to 10 minutes, 80% of the correspondents have the message at teletypewriters in their offices. The system CPU goes on trying to reach the remaining terminals for a full hour (since the addressee may be temporarily engaged or there may be a fault on the line).

Participants in the terminal-based message service are mainly chartering brokers for oceangoing ships and tankers, together with buying and selling brokers, according to A.S. Hammerstein, manager of the KVSA.

Their problem was that urgent orders sometimes went out an hour too late, simply because their own Telex terminals were already working at full capacity and because they had to make every connection with the correspondents themselves. With certain countries, such as Greece, the user may have to dial 10 to 15 times over the international Telex network to make one successful connection.

These delays meant that companies were coming onto the market too late and were consequently losing business. This led these companies to ask KVSA to find a solution.

Message Procedure

Working together with the Projects Office of Philips Nederland, KVSA then developed the Brokers' Telex Service (Selective). Using this, a company only has to present its Telex message to the Philips minicomputer systems, and then the remaining job of making connections and sending is done automatically by those system minicomputers.

The message to be sent is preceded by a so-called group code, which can contain up to 99 addresses. The processor reads this code and then knows where to send the message. With this group code, the sender can also specify which addresses from the group must not be used just this once; the CPU will then omit these when transmitting.

If several group codes are used for a message, the system checks whether the same address occurs in both groups. The message is then sent to that address only once.

"In the course of all this, the text of the messages can only be read by the addressee," Hammerstein said.

"The sender dials directly into the CPU, which relays the message independently. Even we at KVSA are not able to read the messages. In addition, there are safety features built into this system that guarantee that only the participants have access," he said.

Access can only be gained by entering a password. If this is done incorrectly, the CPU will ask for the correct password up to three times. After this, the connection is broken.

Special Codes

The Telex service also works with special service codes, so that the user can quickly know what his position is. Before giving a message to the processor via the so-called QQ code, the user can find out whether relaying can be started directly, or whether there is a certain waiting time, because the CPU is still busy with something else at that moment.

If there is no waiting time, the sender can be certain that within 20 seconds of inputting his text, transmission to his correspondents' terminals will begin.

Via another code, "reporting required" (RR), the user can ask how the transmission of his message has gone. After the CPU has sent the message, it automatically remakes the connection with the sender and reports who has received the message, if necessary, who has not. The cost of sending the message is also transmitted to the sender.

When sending messages, the order of presentation is strictly adhered to by the system. At the same time, the processor sees to it that a message with different terminal destinations is sent on the various lines practically simultaneously.

This last point is particularly important when the addresses are competitors: Brokers' Telex Service (Selective) thereby offers a clear guarantee of impartial service to all terminals in the system.

If a recipient wishes to have a message repeated, he just feeds the output reference number of that message back into the system.

It can also happen that the sender has just specified 40 addresses, for instance, and then a minute later wishes to cancel the message concerned. In such a case, a command from the sender to the CPU is enough to cancel further transmission of the message.

Dual Minis

KVSA now has two dual minicomputer systems at its disposal and a total of 96 Telex lines over which thousands of messages are sent each day. One system is based on dual Philips P 856 CPUs, the other on two P 857 processors. Both systems operate completely in parallel; both are duplicated in order to guarantee that even in the event of a fault, the Telex traffic can continue

(Continued on Page S/8)

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Wild Action Marks General-Use Terminal Scene

(Continued from Page S/2)

types and editing non-IBM-compatible terminals are all included.

Healthy growth rates are expected in all categories, and the CRT share of total installed terminals will jump to 60% by year-end 1983, up from less then 50% last year. With CRT prices continually coming down, high shipment levels should be expected during the next five years and perhaps beyond.

• *Processing, or "smart" terminals,* form the last subsector. Thanks largely to distributed processing, processing terminals will have a healthy future — growing from 10% of the installed base to 15% by 1983. Especially favored will be the clustered terminal systems.

Vendor Lineup

The vendor lineup in the general-purpose terminal market is a real melee. IBM, used to a 65% to 70% share of computerdom, has only 20% of the overall market; and the other Big Bertha, AT&T, has only 12%. Digital Equipment Corp., on the strength of its widely used keyboard-printer and CRT terminals, is the only other supplier with more than 5% of the market.

The other players are Applied Digital Data Systems (Adds) (4%), Texas Instruments, Inc. and Lear Siegler, Inc. (just less than 4% each), Hazeltine (3%), Raytheon Data Systems Co. (just under 3%), General Electric Co. and Datapoint Corp. (2.5% each). After these come a whole wave of second-tier suppliers — companies like Computer Devices, Inc., Mohawk Data Sciences Corp. and Pertec Computer Corp. — that have more than 12,000 devices installed domestically.

Market Shootouts

As befits the Wild West image, shootouts are common. And each subsector has its own heroes and challengers. Here are some of the more interesting situations:

• The key-to-disk vendors, led in market share by Pertec, followed in order by Inforex, Inc., Nixdorf/Entrex, Mohawk and Data 100, are beginning to feel the pinch of a limited market. Most are trying to shift to the intelligent terminal distributed DP market; few are meeting immediate success.

• In conversational keyboard-printers, the Teletype Corp. Model 43 is taking up the slack from the models 33 and 35 — an example of portable devices taking over for the larger, stationary devices.

• The IBM 3767 and 3770 have never reached the heights promised (although they still account for 50% of the base); and Telex's Terminal Communications has considerable success in the IBM plug-compatible area. Older models in the editing keyboard-printer market are losing ground to less expensive CRT-printer combos.

• "Dumb" CRT terminal vendors have proven smart, many shipping 20,000 to 40,000 a year to a seemingly endless marketplace. New entrants are still joining leaders Adds, DEC, LSI, Hazeltine, Ann Arbor Terminals, Inc. and Beehive International, Inc. Vendor forays into the intelligent terminal markets have met with less success — leaving them to rely on their OEM dumb terminal sales.

Pressure on IBM

IBM finds itself most challenged in two areas: 3270s and processing terminals. Both areas show very good growth rates.

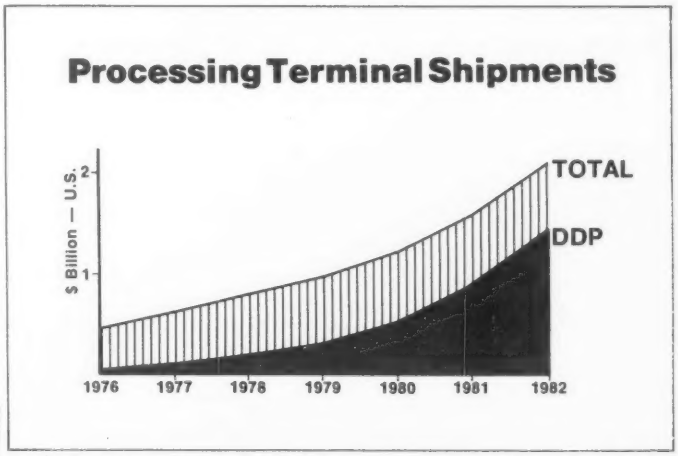
The 3270 area is a cut-throat market. Many of the plug-compatible manufacturers (PCM) are at the mercy of IBM pricing strategies, and had not IBM had trouble delivering its new 3278s fast enough to beat demand, the damage wreaked by the new models might have been more extensive.

IBM has but 54% of the market; Raytheon has 10%; Courier Terminal Systems, Inc. and Harris Corp., 6% each; Telex close to 5%; and Genesis One, Memorex Corp. and Teletype all about 3%. In all, there are 500,000 IBM 3270s and plug-compatible 3270s installed in the U.S. — the single most prolific market.

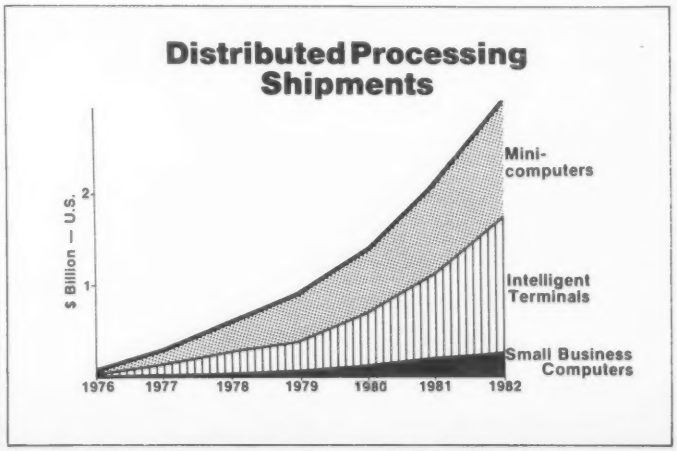
In fact, IBM has set a standard with the 3270 for interactive terminals; and the more interactive on-line computing users get into, the more 3270s (PCM

(Continued on Page S/16)

Year-end 1978 saw the general-purpose terminal market breakdown — excluding keypunches — as shown above. IBM and AT&T together accounted for one-third.



By the beginning of 1983, distributed processing will provide much of the demand for processing ("smart") terminals — or 65% of a market topping $1 billion. Much of that impetus will come from the IBM 8100.



For the distributed processing market as a whole, intelligent terminals will account for about half of all distributed DP shipments by value by 1983.

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Model 745

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The versatile 745 is also earning the interest of people outside the banking industry. Salesmen, real estate and insurance agents are capitalizing on the 745 for remote data entry and distributed network applications.

Producing quality, innovative products like the 745 portable data terminal is what TI is dedicated to. And TI's over 200,000 data terminals shipped worldwide are backed by the technology and reliability that comes from over 30 years of experience in the electronics industry.

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If you would like more information on the Model 745 portable data terminal, contact the TI sales office nearest you, or write Texas Instruments Incorporated, P.O. Box 1444, M/S 7784, Houston, Texas 77001, or phone (713) 937-2016.

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Thanks to Virtual Data Link

DP Sites Make Near-Miraculous Consolidation

ATLANTA — When Sun Life Insurance Co. of America acquired Coastal States Insurance of Atlanta in March 1978, Sun Life's DP vice-president found himself with a problem — his boss wanted to know how fast he could move the entire DP operation from Baltimore to Atlanta.

The problem was also a challenge for Eli Dabich. Sun Life had acquired another small company in Ohio in addition to Coastal States, and corporate strategy called for creation of a service company in Atlanta to provide DP services for an evolving "Sun Group."

After much thought, Dabich came up with a tentative plan for five months, scheduling the move for Labor Day weekend.

"We didn't announce the decision right away," Dabich said, "because we weren't sure exactly how we would do it."

Concerned About Support

The basic problem focused on how to continue supporting 13 IBM 3277 CRT terminals, many user departments and an array of other equipment in Baltimore during and immediately after the move. Sun Life needed to build computer rooms in Atlanta, relocate the entire staff and move an IBM 370/138 mainframe and a Hewlett-Packard Co. 3000 mainframe — along with all of their peripherals — 650 miles.

"There was just no opportunity to do the software development required to support those CRT terminals," according to Jack Hiatt, technical support manager.

In addition to the problems posed by having to write new teleprocessing software, Dabich and Hiatt found hardware changes to be another barrier. Supporting the remote terminals would have required IBM front-end processing equipment, which IBM could not deliver for six to eight months.

In general, Hiatt and Dabich found that IBM could not supply the terminals and other units they wanted in the time frame that was dominating their planning process. IBM's remote job entry (RJE) systems really didn't support what we needed, either," Hiatt said.

What Sun Life needed was fast delivery, flexible peripheral units and a turnaround time in becoming operational that appeared near-miraculous at that point in their efforts to meet the deadline.

Dabich asked Hiatt to consult Datapro Research Corp. and see whether anyone had come up with an alternative to the traditional solutions to remote teleprocessing terminal problems. Hiatt returned with the report that the PIX II "virtual data link" system from Paradyne Corp. looked like an approach that could do the job.

PIX II eliminates the need for complex teleprocessing software or added hardware overhead on IBM 360 and 370 systems by performing the communications processing function itself. A PIX II Local Control Unit (LCU) linked to a PIX II Remote Control Unit (RCU) provides an interface between mainframe and peripherals so that every device is "seen" by the host as being in the local mode.

"If we had gone with another system, every device would have to be identified as remote. With PIX II, as far as our system in Atlanta knows, every device is in the same room," Hiatt said.

Dabich and Hiatt contacted Paradyne and arranged for a demonstration in Atlanta. After spending a few days with another user that was already using PIX equipment, they made a decision to go with the same system.

"We told our users that our policy would be 'business as usual' and that they wouldn't notice the computers had been moved," Dabich commented. "We moved two large systems 650 miles and were operational in a new facility in 31 hours."

Instead of months of costly software development and hardware acquisitions, PIX II

(Continued on Page S/20)

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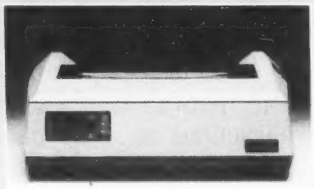

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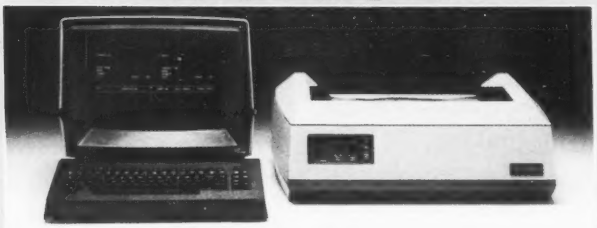

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RACAL The Electronics Group

Users Able to Design Their Own Teleprinters

By Ronald R. Ogg
Special to CW

Most products in their early life usually come in rigidly defined packages that are often called "the plain vanilla" model. They deliver a single function well, but have very little adaptability to a variety of environments or operating conditions.

This was certainly true of the earliest teleprinters, which for more than 15 years — after the first teleprinters sent messages to and from computers — remained fairly constant in terms of the basic function, method of interconnection and range of options. Only speed, a few operator convenience functions and packaging tended to be added.

Today's newest printer terminals have reached the other side of the pendulum swing. The design is so modular that users can literally design their own terminals by merely selecting which of a variety of options or features they wish to add. In some cases, they can even select the level of print quality desired within a single terminal family.

What caused this swing from rigid product design to highly modular configurability? As in the automobile industry, the answer has to lie with the consumer — his needs and personal preferences.

If this is the case, then what does a buyer want in a printer terminal today? What should the potential user be looking for when he evaluates a terminal supplier's offerings?

In the past, the answers to these questions were easy. You looked at print speed, transmission speed, data mode and the number of units installed to assess the manufacturer's reliability.

Points to Consider

In the latest printer terminals, at least a dozen different criteria must be examined — and within each, a further examination of the performance range offered by the supplier should be made.

The most important of these criteria are print speed, print quality, range of interfaces, ease of interfacing, standard features, programmable options, pluggable options, special functions, keyboard varieties, ease-of-use options, accessories and supplies. These are the product-related criteria.

Beyond these, a potential buyer must assess the product's in-life reliability, service experience and factors such as pricing and delivery.

Examination of the product-related factors shows a wide range of modular features that can be specified and configured by a user to meet one or many terminal-based printing requirements.

In terms of print speed, a user of a low-cost terminal printer can select from 10- to 15 char./sec up to 200 char./sec.

Speed can have a major effect on print quality, especially in newer terminals. An anomaly of the products in today's market is that the lowest quality output occurs at the lowest and highest speed ranges, while the best quality occurs in the middle range.

That is, teleprinters at 10- to 15 char./sec and matrix printers at 120- to 250 char./sec offer print quality that cannot compare with products in the 30- to 100 char./sec range, in which daisywheel and fully formed matrix characters produce exceptional quality.

These fine-quality printers are gaining an increasing share of attention as more and more terminal users want both aesthetics and function as long as there is no price penalty.

In addition, many terminal network users mix and match print speeds and print qualities within their total system, using some terminals for high-quality word processing and correspondence output and others for basic reports or program listings.

Boost From Micros

The availability of advanced microprocessors has enabled terminal designers to incorporate unique concepts to speed interface development and simplify the adaptability of a specific terminal to an operating environment.

One supplier has introduced a "universal" interface for a new series of printer terminals that support remote word processing communications and other high-qulity printing applications.

The "universal" interface permits commonality among major elements such as keyboard send/receive and receive-only devices, plastic or metal wheel devices, and offers a number of standard features. Its firmware, moreover, allows users to configure terminals with options and functions optimized to each application.

The concept of universal terminal interfaces will become increasingly popular.

The next category of function to look for is "the stripped-down model." What are the terminal's basic standard features — the starting place at which a user can begin to customize?

Today, most products offer the print element; an RS-232 serial interface or possibly an Ascii parallel interface; sensors such as end-of-ribbon paper out and cover open; a buffer; and usually some method for installing options. Programmability, graphics, self-test features, high-speed communications and compatibility with other products might also be included in the standard features package that comes right off the assembly line.

Next, it is very important for a user to look into the range of optional capabilities offered within a terminal family. For convenience and comparabil-

(Continued on Page S/16)

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We found that one of the primary concerns of small business owners is that they'll have to restructure their business around the computer. But the TaskMaster computer doesn't change what you've established. Instead, it fits easily into any work environment, ranging from office to scientific and industrial areas. We designed the TaskMaster to be expandable, too, so it can grow as your business grows. Just add more applications packages when your company expands. That way, you won't need to buy new equipment or hire new people to do the work.

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Our TaskMaster includes the most modern hardware: a flexible disk system or an optional hard disk for maximum data storage, plus a full-screen CRT and printer. (You can choose between two printers: a medium-speed, letter-quality printer or a high-speed matrix printer. What about applications? We provide a standard package we call the Accountmaster. This package contains *more than eighty* general business functions. And it's easy to learn. We thoroughly train your people, then check back to see that everything is running smoothly. And we'll be around when you need us.

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With a TaskMaster computer, you also get our strong service organization, our strong dealer network, and our ten-year, ten-thousand terminal history of dependability. We're proud of our credentials. But the thing we're proudest of is our customers. Add *your* name to our list. Arrange to visit one of our dealers' offices for a demo. Write or call Data Terminals and Communications, 590 Division Street, Campbell, CA 95008. (408) 378-1112. TWX (910) 590-2436 to find the dealer nearest you. Or send in the coupon below.

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Service Speeds Shipping Brokers' Messages

(Continued from Page S/3)
with practically no loss of time. The possibility of messages getting lost is also ruled out by this duplication.

A message input on a teletypewriter terminal by the sender is stored on the Philips X 1215 double magnetic disks and at the same time on a magnetic tape cassette. From the disk, the message is always directly available for 24 hours for repeated transmission. The message is then kept on the cassette for two more weeks.

Communication with the system takes place via Philips PER 3100 printers. On a journal printer, the system gives a minute-to-minute report of what it has done, stating when a message has come in, when the transmission was completed, when this was reported to the client and what costs must be charged to him.

Data for invoicing the participants is taken from the system via the cassette tape and presented to a Philips P 430 office computer, which automatically generates invoices.

More General Interest

Faster and more efficient Telex traffic on the basis of an automated system can also be of interest to other users like banks, freighting and transport companies, public institutions and companies with scattered branches. In practice, every Telex department comes up against the same problems whenever a few hundred messages are received each day for further dissemination.

Processing messages by hand quite easily leads to errors in numbering and transmitting, in calling up and identifying subscribers and in checking serial numbers, priorities, lines and terminals. Time is wasted when the desired line is engaged and the user must try repeatedly and keep waiting. Even finding the desired punched tape and correcting it does not always go off smoothly.

Certainly, at the time, the punched tape was a first definite step towards automation. But for really fundamental approach to the problem, right now it is a question of an automated system between the user and the Telex network. Both dialing of the lines and the actual transmission then go considerably faster, resulting in shorter engagement of the lines. This also often means that one can do with fewer lines.

The user of this Telex terminal system, the KVSA in IJmuiden, acts as agent for the ships in the IJmuiden harbor area and as a report agent for the shipping agencies in Amsterdam and Zaanstad.

For the 140 or so participants in this terminal system, KVSA now offers a means of communication with the entire world.

TCUs Help DP Center

(Continued from Page S/2)
passed to the second through a channel-to-channel adapter.

"As the system continues to grow, however, we will have to run one of the CPUs as an MVS batch machine all the time and the other primarily as an MVT/TSO machine," Stephenson explained.

The Memorex 1270 can automatically recognize a communications line speed and adapt to it. The unit accommodates asynchronous (Ascii and BCD) codes from 110- to 9,600 bit/sec, binary synchronous (Ascii or Ebcdic) up to 9,600 bit/sec and wide-band lines up to 50,000 bit/sec.

Though the computation center uses the 1270's automatic speed detection capability, it does not use the unit's capability of determining the terminal type from the line speed.

"We don't use this feature, because we have enough lines to keep the IBM lines separate from the Ascii lines," the associate director said.

Plug Options

The 1270 lets the user actually "program" — that is, use plug options — for specific terminal types and speeds. For instance, he can select automatic speed detection and the specific terminal type.

"This means that when terminal types change, we can make the necessary changes in the terminal controller ourselves. We don't have to depend on a vendor to come in and make the changes," Stephenson explained.

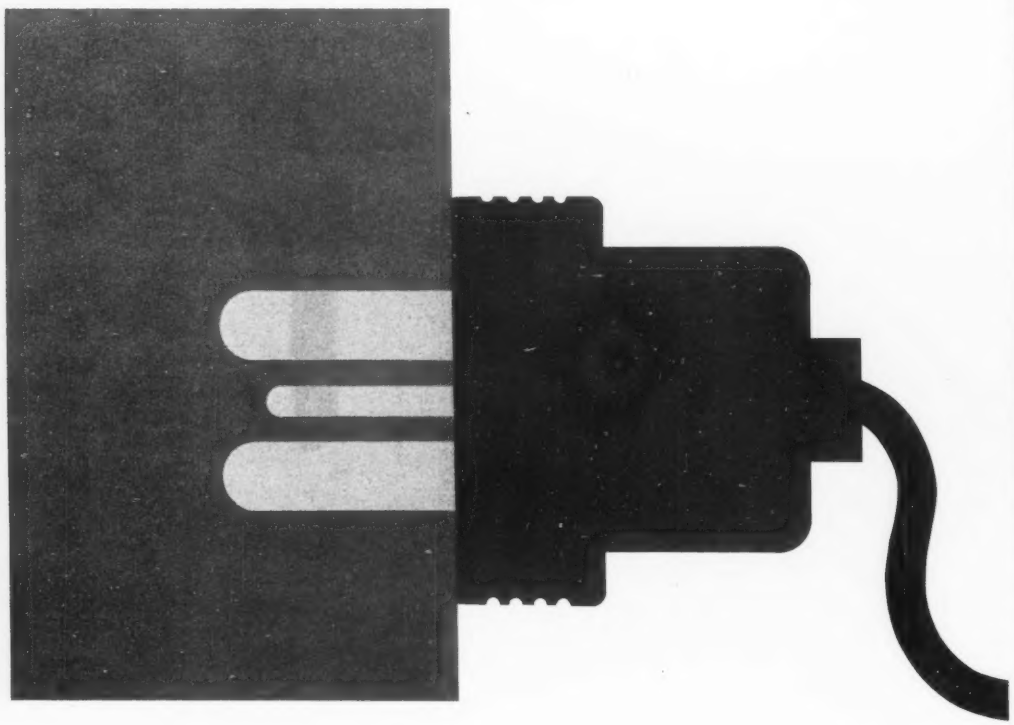
When customers call up to tell the center that their terminals have stopped working properly, the center can quickly determine whether the problem lies with the user's equipment or with the center's equipment.

"Basically," Stephenson said, "it's a process of elimination. We can take the 1270 and switch EIA interface cards (the point where the user is actually connected to the system) or line adapter cards without affecting the other users.

"If the user's terminal still doesn't work, this shows that the problem is not in the control unit. In this way, we can isolate the equipment that is peculiar to a specific user, thus eliminating problems at our end."

According to Stephenson, the 1270 goes down no more than once a year. Most of the 1270 troubleshooting usually demonstrates that the problem is in the user's circuit or modem.

"The control unit has been a cost-effective piece of equipment for us," he said. "It has been extremely reliable and easy to work with."



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Using Data Direct From Exchanges

Graphics CRTs Give Commodities Analyses

MOONACHIE, N.J. — Trading in commodities — gold, silver, coffee, strong currencies, pork bellies and so on — is one way of trying to stay ahead of inflation. In fact, a lot of conservative investors are turning to the commodity markets to make money.

They are being helped by graphics terminals used by commodity traders and linked by telephone lines to a minicomputer system that provides instant access to a broad range of data.

Commodities trader James Sinclair makes purchase decision after checking technical market analysis on a Hewlett-Packard Co. 2648 graphics terminal in his office.

The flexible system gives traders the latest price information from the floors of the commodity exchanges and displays it in a number of ways to help them analyze, using up-to-the-minute data, what the market is doing. Analysis on as many as four different graphs can be viewed simultaneously, with the transaction time between posted market price and the graphics terminal analysis nearly zero.

Further, traders using the system in various parts of the country can be working with the information of interest to them only. The New York gold trader has the latest data on his commodity at the same time the Chicago wheat dealer is looking at future prices on his terminal.

The services developed and offered by Computer Machining Technology Corp. and being used by such clients as E.F. Hutton & Co., Delphi Commodities, Pan American Bullion Corp. and James Sinclair Trading Co., are centered on two Hewlett-Packard Co. HP 1000 computer systems and an HP 2648 graphics terminal at each client's office.

"It's the best equipment we could find," CMT vice-president Steven Moss said. "It's not the cheapest but it is the most reliable. And in this business, where you have some of the brightest minds seeking to make as much from the market as possible, you've got to have efficiency, dependability and the latest technology."

Data Route

Price data from the six commodity exchanges in the U.S. is received at the two HP 1000s in CMT's headquarters here via direct lines from the exchange floors and processed into the proper form. One of the systems is used for backup to prevent downtime, which can seriously hurt traders since commodity markets are open only four hours a day.

From the CMT offices, the information is sent to the customer's graphics terminals along a 4,800 bit/sec line. The programmed data is then displayed in the way the client wishes on the terminals, which have multipoint capabilities and can be grouped with other terminals on one incoming line at the client's remote location.

CMT owns the terminals and provides them on a monthly basis.

The service offered by CMT makes available enough information so the trader can reach more informed decisions about buying or selling. It gives him a perspective for smart trading.

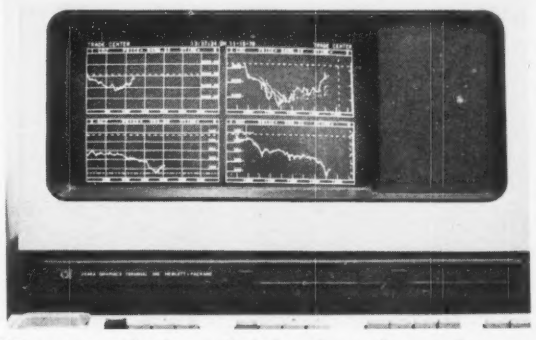
At a touch of a key, the trader himself, or a terminal operator working for him, can divide the high-resolution CRT screen into four different quadrants, each with a different price analysis.

Further, he can order the system to zoom in on one quadrant — enlarging a particular piece of data there as much as 16 times — and then return to the original configuration without losing any of the information in the other three quadrants. The graphics memory is not disturbed.

Typical Analysis

In the case of gold, the displays of interest might be:

- A long-term look at the closing price, connecting each day with the previous day. The system is capable of providing information on as many as 300 trading days, and there are plans to expand that.
- A bar chart showing the price movement, which fluctuates in real time with the action on the gold exchange to show high, low and latest price.
- An overall presentation so the trader can compare the performance of gold with silver over a certain period. This gives an idea of the relative strength of one to the other and provides a basis for investment.
- An average of the closing price each day, an average of each transaction every day or moving averages for any time period. For example, moving averages for a 10-day period would not include data prior to that period. The user selects the averages; they are not predetermined. As markets and situations change, the averages can be altered to fit them.



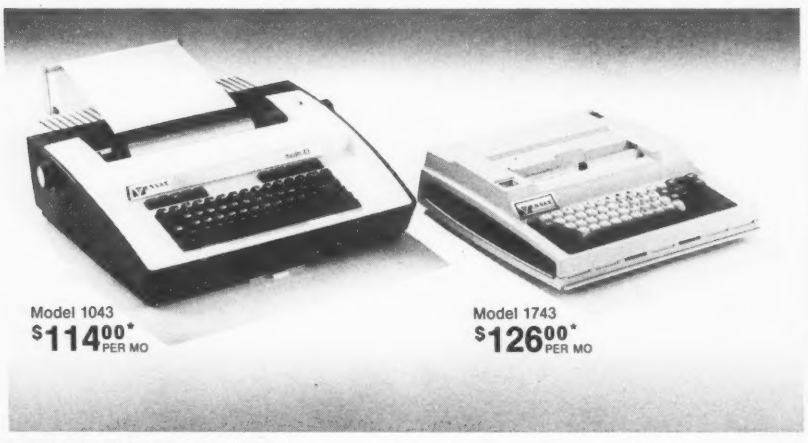
HP 2648 provides four technical market analyses at the same time.

"All the capabilities we offer for performing technical market analyses are already programmed into the host computer," Moss said. "The intelligence of the graphics terminal allows the user to interact with the computer, giving him more flexibility to reach buy-sell decisions than he's ever had before."

CMT began operations in 1956 as an engineering and manufacturing firm using tape-controlled, numerically controlled and computer-controlled machine tools to produce ball valves.

Talents of CMT computer programmers were called on to help create a program to ana-

(Continued on Page S/20)



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Net Helps Direct Marketer Sell to Millions

MINNETONKA, Minn. — Fingerhut Corp., one of the largest direct-response marketing firms in the world, makes extensive use of a DP terminal network to market a broad selection of merchandise directly to consumers.

"We make in excess of 200 million mailings and process more than five million orders and 17 million payments a year. Our customer base consists of 10 million people. Take away our computer and we'd be out of business," Theodore Deikel, president and chief executive officer, said.

Fingerhut accelerated its use of DP in the mid-'70s, when the corporation installed IBM's IMS data base/data communications management system to maintain more complete records for active customers. The system reportedly provided tighter information control and enabled Fingerhut to cut inventories in half and eliminate $57 million in debt.

In addition, the company cut average customer response time in half and now realizes an annual savings of $300,000 in customer service operations.

Operations Turnaround

"The IMS system played a major role in enabling us to turn the company's operations around during the 1974-1975 recession," Deikel explained.

"Today, we're using the system as a potent marketing tool. It provides us with invaluable leads on the best prospects for each of our merchandise lines and expands and improves the effectiveness of credit administration, inventory control and other applications," he explained.

All of these applications, plus others such as order processing and customer service, are supported by Fingerhut's St. Cloud, Minn., DP center, which is said to be one of the largest in the Midwest. The 140-person center has two IBM 370/158s with 36 spindles of IBM 3350 disk storage. Operating 24 hours a day, six days a week, the CPUs communicate with more than 60 IBM 3277 CRTs and 3767 and 2740 terminals.

The dual 158s run in an attached processor configuration and include 30 IBM 3420 tape drives and 16 Model 1403 printers.

At Minnetonka, the company has two 3276 and six 3278 terminals as well as a 3776 teleprinter used for remote job entry (RJE) applications. The RJE link runs between St. Cloud and Minnetonka and uses JES 2, a spokeswoman said.

Fingerhut manufacturing sites have IBM 2740 and 3767 teleprinters for communications with the DP center. In addition, 15 model 3277 and 3278 terminals in the network, running under TSO, are used for program development.

The net uses Bell data sets and private lines with a top speed of 4,800 bit/sec although the teleprinters and some other terminals operate at slower speeds, the spokeswoman said.

Prompt Treatment

Prompt handling of customer orders is an integral part of Fingerhut's direct marketing philosophy. Under the overall direction of Gary Litchy, vice-president of operations, orders are fulfilled by a computerized order processing system and shipped from a 750,000-sq-ft automated distribution center/warehouse in St. Cloud that contains 20,000 stockkeeping units.

The automated distribution center uses Fingerhut's on-line inventory control system to maintain stock on the first-in, first-out demand basis, while tracking items down to their lowest level in terms of multiple reserve random locations and ensuring accurate, tight control.

Customer orders are received by mail at the distribution center, where they are keyed into the center's order processing system.

Many orders are the result of solo mailing projects consisting of one big product offering. Normally involving large quantities of a single item, these orders are processed by locating merchandise via on-line terminals and bringing them to a shipping station where they are packed and labelled.

Other orders result from multimailer or catalog mailing projects, which involve small quantities of many different items.

Fingerhut trucks transport orders from shipping docks to drop points in 22 metropolitan areas at least twice a week. From drop points, parcels go to customers via United Parcel Service or the U.S. Post Office.

Customer inquiries by phone or mail are handled on an on-line basis. An immediate on-line response is currently provided for inquiries concerning in-house orders, payments, account balances and correspondence. Customer service personnel are also able to tell customers immediately when orders were shipped and when they reached drop points.

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And the AJ 830 "daisy" teleprinter terminal for just $113 a month, also *including maintenance*.

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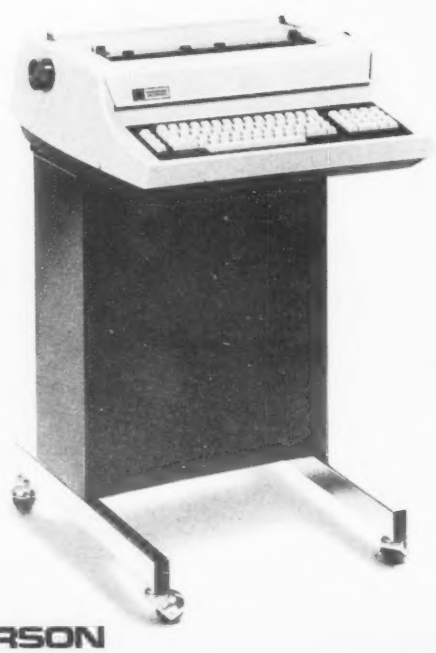

ANDERSON JACOBSON

Small Units Conserve Space

ATMs Score Big With Iowa Bank's Clients

CEDAR RAPIDS, Iowa — Tomorrow's bank will probably have clusters of free-standing automatic teller machines (ATM) in its main lobby and in its outlying offices. There will still be human tellers, but many customers will prefer the speed and privacy of total automation.

Those are but two of the conclusions that can be drawn from the initial testing of two on-line NCR Corp. Model 1770 lobby ATMs at Merchants National Bank (MNR) here.

The conventional security provided by guards and alarm systems eliminates the need for the heavy, vault-type construction of first-generation ATMs. Therefore, the 1770s are smaller, taking up less than half the floor space.

They are also more compact than working spaces designed for human tellers. This suggests, as another aspect of tomorrow's bank, that existing square footage will be ample for serving more customers and that future real estate requirements will be less.

User of in-lobby ATM at Merchants National Bank inserts her magnetically striped plastic card prior to indexing her personal identification number.

The larger, more secure ATMs were designed for after-hours and off-premises usage.

The 1770s dispense two denominations of bills. MNB decided upon fives and 20s for its evaluation testing, but any combination can be used.

Externally, aside from being smaller, the 1770s differ from earlier models in that the operating panel is horizontal rather than vertical, a feature which lowers their height without impairing panel visibility.

The customer still inserts a magnetically striped plastic card, indexes a personal identification number and presses one of six function keys to perform a transaction. Sequential instructions and the amounts for withdrawals are displayed on a CRT.

The 1770s may be used to make either withdrawals or deposits to both checking and savings accounts and to determine account balances. In all cases, customers receive receipts imprinted with the date, type of transaction, the dollar amount and the updated account balances. The same information is repeated on monthly statements.

MNB tested the 1770s for two weeks after their installation to make sure no bugs would snarl operation of what is reportedly one of the most extensive on-line electronic funds transfer systems in the nation. Then for three weeks, two tellers, one at each site, demonstrated the machines and helped customers. After that, the job fell to guards.

Harold E. Loerch, MNB's assistant vice-president in charge of operations research and development, said that in the first month of operation, 2,759 transactions took place on the two 1770s.

Loerch noted that the total of 61,824 electronic fund transfers during the period was 11.6% of the bank's 530,377 debits and credits for the month on personal checking accounts.

"One man told us he only uses an ATM once a month to make sure his Social Security deposit has been made," Loerch commented. "The point, however, is that he, like many other card users, likes the convenience — and the privacy — of electronic banking."

MNB customers must ask for their "Instant Access" plastic bank cards, and to date, 15,883 of the bank's 30,000 demand draft account holders have done so, with the number increasing by about 100 each week.

More important than the number of cards, however, is usage, and it is in this area that MNB officials are particularly pleased. Currently, Loerch said, 74% of the cards are being used, with 43% being used at least once a week and some as often as 10 times a week.

"You'll often see people lined up at an ATM when there are teller windows open," the assistant vice-president said. "That again is proof that automation is popular."

MNB launched its entry into electronic funds transfer with its first on-line grocery terminal installation in June 1976. Its present total of 14 such installations is the largest single bank

(Continued on Page S/18)

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Pullman Picks Public Packet Net, Cuts Cost 30%

CHICAGO — Pullman, Inc., a diversified multinational company, has reportedly achieved a 30% reduction in its asynchronous terminal communications costs after subscribing to a public packet network. Pullman manufactures, leases and finances transportation equipment and engineers and builds industrial plants all over the world.

Jim Schulz network supervisor at Pullman's central DP center in Houston, said his company's five divisions and corporate offices now access Tymnet, Inc.'s network for all its internal communications needs. The company has adopted Tymnet's message-switching service, Ontyme, as the basis for its electronic mail system.

"Before Tymnet, we could never drop our average hourly dial-up communications costs below $9. Current hourly costs now average $6.33.

"And since we plan to increase use of Tymnet, we expect further reductions," Schulz said.

Earlier, Schulz had considered building a proprietary domestic asynchronous network to fulfill Pullman's communications requirements. But he found that the costs for the multiplexing hardware alone would have been 10% to 15% greater than the actual cost of the network service.

Had a proprietary network been cost-effective, Pullman would still have had to assume the burden of network management.

"We decided on Tymnet primarily because of its accurate, cost-effective service, rapid response time and value-added features," Schulz stated. He also liked the network's error-checking, retransmission and alternative routing capabilities, as well as the flexibility of the network's software support.

Pullman needed a network with broad international access at reasonable rates. "For example, we had a small international application that we couldn't access domestically because of the prohibitive leased-line costs," Schulz said. "Tymnet solved that problem and the application has grown substantially."

Pullman switched its company users to Tymnet within a two-week training period. In preparation for that period, the network vendor installed Pullman's Tymcom hardware and software in half a day.

Switching Interfaces

In August 1977, Pullman subscribed to Tymnet service with a Tymcom CP-16A/1200, a 16-port asynchronous interface with up to 1,200 bit/sec capability. After considerable expansion in its communications needs, Pullman has installed a 30-port-capacity replacement — a Tymcom CP-30A/1200.

Currently, Pullman has four IBM 370/158 mainframes on Tymnet offering TSO, APL, Basic, Fortran, CICS and ATMS. Using state-of-the-art systems software, these CPUs support a variety of applications including scientific and engineering program development, word processing, financial analysis, information retrieval, material and inventory control, vendor control and order entry.

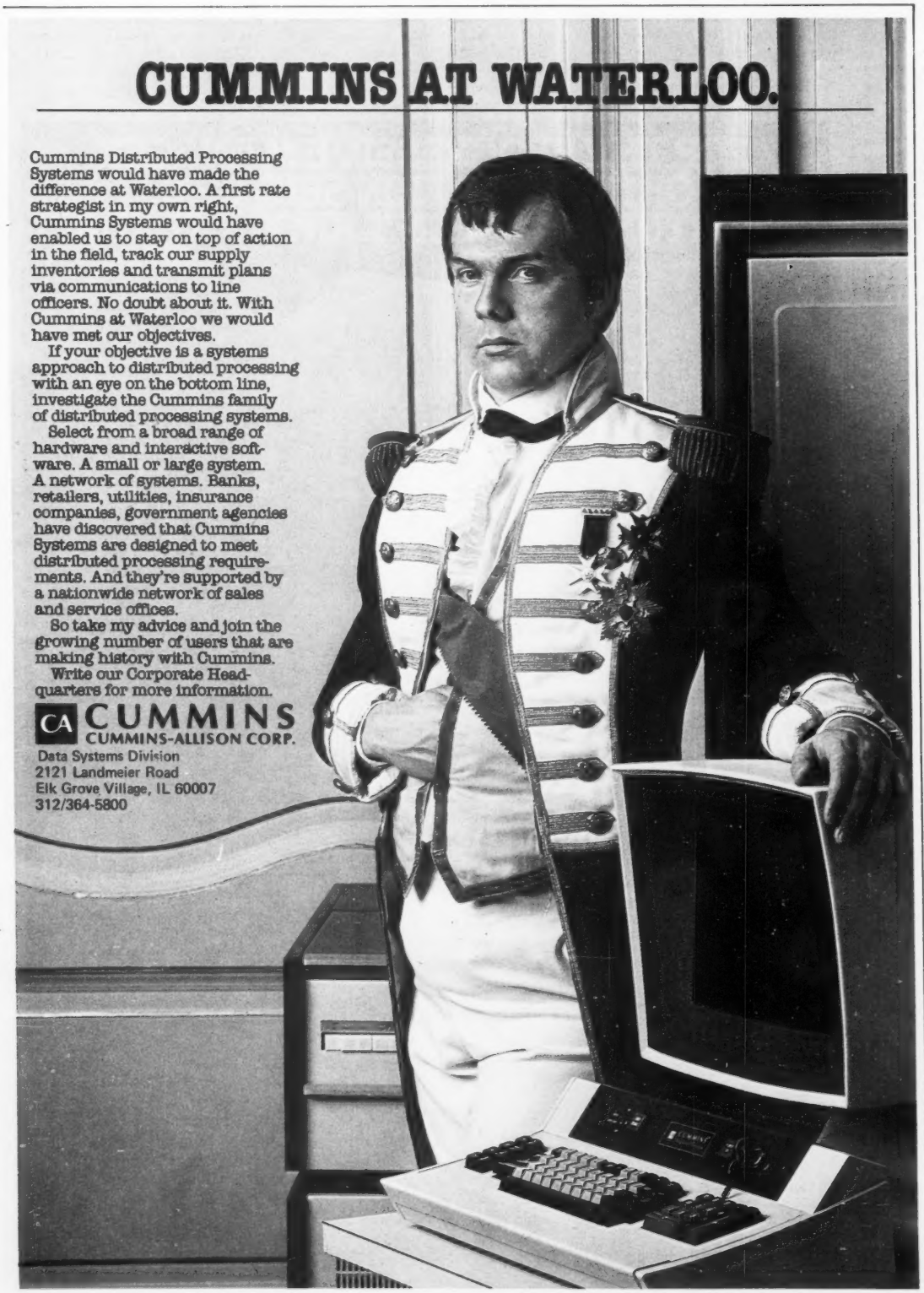
"Engineering applications benefit from Tymnet because of the network's quick response time," Schulz pointed out. "This has improved personal computing efficiency.

"Now, when engineers need quick solutions to problems, they can solve them with their own APL programs. They don't have to come to the Systems Department and wait up to a month for the solutions."

Pullman Trailmobile, the division that manufactures and distributes Pullman's trailers, is the biggest Ontyme customer. The division uses Tymnet's message-switching service to conduct electronic correspondence among approximately 50 local and regional sales offices.

Pullman is encouraging its other divisions to take greater advantage of the service, and it expects increased usage over the next several months.

The company has many types of 110- to 300 char./sec terminals on the network. Each division can access the network using one local telephone number.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Net Coordinates Aerospace Supplier Activities

LIMA, Ohio — Although the Aerospace Division of Ex-Cell-O Corp. sells turbine and compressor parts to a relatively small number of purchasers, typical orders call for thousands or tens of thousands of parts to be shipped from the firm's four manufacturing facilities in specified quantities each month over a period of years. These requirements mandate the incorporation of the latest advances in terminal-based equipment.

The DP center here that services the Aerospace Division communicates with remote terminals in Fostoria and Greenville, Ohio, and in Elwood, Ind. The center also serves the corporate DP unit at Walled Lake, Mich.

This network was needed to adequately coordinate plant activity and to monitor production efficiency. The division originally keyed data to magnetic tape and transmitted it by telephone lines, according to Lima DP Supervisor Bob Lee.

"There was no editing of data and no computing capability outside the CPU. We needed to decrease turnaround time between collection of data at the satellites and its return in processed form and to perform some processing interactively on site rather than through transmission to Lima," he explained.

"We were looking for two things," DP Manager Herman Crow said. "We needed more computer power and to build a distributed DP network through which we could take advantage of intelligent data entry. This would allow us to distribute file information efficiently and decrease error ratios during data entry, thereby reducing turnaround time."

Filling the Bill

New equipment had to satisfy three primary criteria. "We were concerned about price, performance and the availability of service," Herman Crow emphasized.

"We looked at terminals from Four-Phase Systems, Inc. but we are, geographically, a bit remote from its offices, and service was a critical point. In addition, we didn't know anyone using that equipment and had to rely on what the salesman said would be available and could be done," he recalled.

User testimonials proved to be quite an important factor in Ex-Cell-O's final decision. "We first became aware of Sycor, Inc. through a local company, Vistron, where Sycor 350 terminal systems were being used," Crow continued. "We then looked at the local service bureau using Sycor equipment. And when we found out that the Sycor 440 system was available, with its many features — that 's what we went to.

"The cost of the Honeywell, Inc. and IBM equipment — for the return we would get from it — was higher," Crow said. In addition, Cobol was a very important feature, since the Lima program repertoire was written in Cobol.

Lima DP center supervisor watches operator enter labor ticket information.

Confident that his three primary criteria had been satisfied, Crow purchased a 440 with three CRTs, 64K bytes of memory, a 10M-byte disk drive, one 180 line/min printer and a 7-track magnetic tape drive for the Lima data center.

Similar 440 configurations were installed at Fostoria and Elwood, each with a 600 line/min Sprinter printer. A Sycor 410 system with one CRT and a 5M-byte disk drive was installed at the smaller Greenville plant.

With the systems, interplant communications is performed in both asynchronous and bisynchronous modes, and terminals are conveniently located within the plant complex. "Here in Lima, all systems are in the data center," Crow related. "In Elwood, terminals are strategically placed throughout the data center, the purchasing department and the shipping and receiving department. And at Fostoria, two terminals are located in the data center and in purchasing. This way, system availability is literally placed at the hands of each end-user," he noted.

Time Allocations

According to Crow, 60% of system time is allocated to data collection ap-

(Continued on Page S/18)

Data entry operator enters production counts.

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The data entry people. **IESI**

General-Purpose Terminal Area Running Wild

(Continued from Page S/4)

and IBM) they'll need. Even distributed DP shouldn't preclude the use of 3270s — as the IBM 8100 and new 4300 or E series use them for data entry.

In processing terminals, IBM's entrant heretofore was the 3790, known mostly for its lack of success. But even before the 8100 which IDC classifies as a clustered processing system — the 3790 began to pick up some respectability.

And the 8100 is an impressive machine — impressive enough to pace the clustered processing terminal market to a hearty 35% annual growth rate into the 1980s.

In fact, the 8100 should be the prime impetus in helping the intelligent terminal makers ply the distributed processing market, primarily a minicomputer domain to date. By 1983, more than 65% of processing terminal shipments should be going to distributed computing markets, primarily on the basis of the 8100. More than half the equipment shipped for distributed DP use by then will be from intelligent terminal vendors.

Vendors Repositioning

Brownian motion refers to the random movement of molecules in a substance. And just as Brownian motion increases as a substance is heated, activity among terminal vendors increases as steady upward growth rates heat up the marketplace.

In short, the vendors are repositioning.

- Key-to-disk suppliers are stabbing at the intelligent terminal, distributed DP market. Their methods: acquisition and internal development.
- Conversational CRT vendors are adding intelligence, hoping to exit through the upper door to a new market.
- Keyboard-printer makers are shooting for specialized industry markets and are adding portability to their devices.
- Stand-alone processing terminal makers are finding new competitors, up from the lower ranks, with less-expensive, less-sophisticated products that aim for distributed and personal-business applications.
- Clustered processor makers are targeting on distributed processing.

Fallout Alert

There will be fallout from all this activity. For one thing, repositioning takes money, either for acquisition or in-house development. This means there will be more acquisitions, dropouts, and shakeouts to come.

The vendors are as competitive as miners during a gold rush, and many of the more lucrative claims have already been staked out.

And who will be sheriff of Boomtown? IBM or AT&T? Which giant will wear the white hat, which the black? IBM has its 3270 and Systems Network Architecture for credentials, while AT&T touts its Dataspeed 40s and newly announced Teletype 4540 follow-on.

If the communications monolith adds Synchronous Data Link Control (SDLC) capability — and there's no reason it can't — the competition will become even more intense. Add an Advanced Communications Service (ACS) and perhaps SDLC to its capabilities — and suddenly the users may have a new champion.

But one thing is certain. At the rate computers are proliferating and users are seeking interactive solutions, five years from now the markets for terminals will still be raucous. Change will still be the order of the day.

The territory will still be untamed. And there will always be some new kid striding in the dust at the other end of town, looking for the fast-draw veterans.

Rogers is program manager of the Corporate Planning Service at International Data Corp. in Waltham, Mass.

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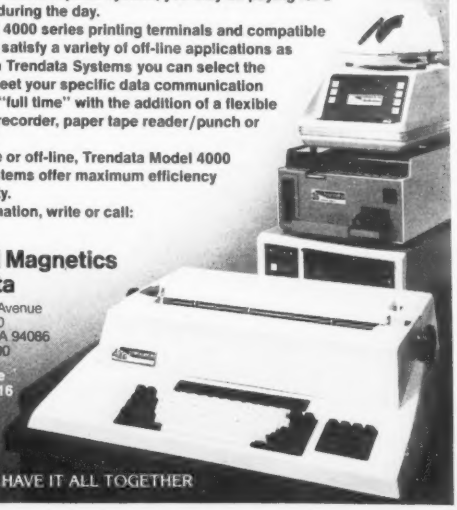

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OUR TERMINALS HAVE IT ALL TOGETHER

Teleprinter Makers Allow Users to Design Their Own

(Continued from Page S/7)

ity, these can be grouped into four classes: interface options, programmable options, pluggable options and advanced function options.

Interface options include alternate communications methods such as current loop and manufacturer- or product-compatible interfaces. They include various protocols, handshaking and transmission rates and formats.

Programmable options are those that the user can define or alter for himself. They should be easily implementable at the user level. They include special firmware development and alteration of standard functions and capabilities. Programmable options are greatly simplified if the terminal uses a standard microprocessor and if good development capabilities are available.

Pluggable Options

Pluggable options are features that can be added quickly and simply by putting an additional circuit board or chip into the terminal; typically such options are "here is" answerback, expanded buffers, protocol emulations and the like.

Advanced functions are rapidly growing in popularity. They include capabilities like adding word processing enhancements such as right margin justification and automatic proportionally spaced printing; alternate printing capabilities such as APL or foreign language fonts; vector plotting; external and user diagnostics; and support for a variety of forms-handling equipment.

Does the printer terminal have a single keyboard available, or many? Some teleprinters, for example, have multiple standard keyboards to choose from such as typewriter-paired, logical-bit-paired, French Azerty, Norsk/Danish, Scandia, German and APL.

As data communications makes greater use of satellites and international protocols such as X.25, the ability to send messages worldwide inexpensively makes such keyboard varieties increasingly important. The ability to customize keyboards is a logical extension of this expansion of worldwide terminal use.

The same is true of terminal accessories. Will the terminal applications require continuous forms or single-sheet paper; 80 to 132 columns, or special widths; multipart preprinted forms with 10 or 12 copies or more; ledger card preparation; or combinations of all of these?

Finally, the availability and quality of supplies are factors to consider in choosing a printer terminal. What fonts are available if removable print element devices such as daisywheel printers are being considered? What range of ribbons from fabric to multicolor to multistrike are available?

It may seem that supplies are a small item, but they impact directly on the user's ability to make maximum use of the terminal, so they should be checked out during the evaluation.

It may seem that these innumerable options and features are unnecessary on a teleprinter, but it is the user who is requesting and buying them. And users can expect to see the trend to complete printing systems continue.

The goal of suppliers is to deliver a complete printing system that will do precisely what the user wants it to do at the right price and with the flexibility and expandability to accommodate future plans.

Ogg is product manager for printers and terminals at Diablo Systems, Inc.

"I buy the best."

—Harold Feinleib, VP, Systems Development, National CSS

The printers were so loud you couldn't hear yourself think. Till we bought ourselves a little peace and quiet.

I'm Harold Feinleib. About a year ago we purchased over 80 ADDS Regent 200s for our programming and systems staff at National CSS.

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ADDS REGENT

Net Coordinates Aerospace Plants' Operations

(Continued from Page S/15)
plications, where terminals communicate with Lima, and processing is performed on the CPU. The balance of time is employed for in-house applications at each plant, using the Sycor systems' stand-alone intelligence capability.

Attendance records, labor distribution reports, accounts payable, general ledger inputs, daily production reports and payroll are handled via data entry, with inventory control, order entry and receiving accomplished at individual terminals.

Asked to describe the data gathering and return procedure, Lee responded: "Each plant has a complete set of data entry programs including editing and master file updates. Data is collected in files on disk, processed and transmitted daily to our 440 here in Lima, where the information is recorded on magnetic tape.

"The tapes are then input to the CPU and reports are generated and retaped on the Sycor 440 terminal for transmission back to the satellite plants. We transmit each day for about 45 minutes early in the morning," he said.

At Elwood and Fostoria, inventory stores records are maintained on the 440s. Originally the stores' crib operated with a manual card file system but this quickly became bulky and unmanageable. They then went to a system that ran on the CPU. While this was an improvement over manual recordkeeping, this system also had its deficiencies.

Now, with inventory files maintained on the 440 terminals within each plant, "When people in the plants want to know something, it's right there. They don't have to call Lima for a report. They wanted control of their crib inventories — and our Sycor systems have provided this control," Crow reported.

'There was no editing of data and no computing capability outside the CPU. We needed to decrease turnaround time between collection of data at the satellites and its return in processed form and to perform some processing interactively on site rather than through transmission to Lima.'

All entry of purchase orders, receiving records, stores issues and price changes is performed through the 440 terminals. "Our users have a complete display system so they can see how many purchase orders are out, how many parts have been received, the vendor they were ordered from — everything," Crow continued. "They can call it all up on the CRT. They know it's there and they know it's correct."

Order Entry

At Fostoria there is an on-line automated terminal system for order entry, invoicing and shipping. The on-line, interactive approach at Fostoria has dramatically decreased the labor necessary for preparation of shop documents. Elimination of the associated duplicate typing has greatly reduced the number of errors.

"The system operation is simple," according to Bob Lee. "When a new purchase order or a supplemental agreement is received, particulars are entered at the terminal keyboard. These include customer code number, salesman's code, commission rate codes, product line control number, product code and data relating to the engine series in which the part will eventually be used."

Purchase order information is entered at one time and filed. Subsequently, when documents are issued from the purchase order file, all information necessary for hard-copy printout is immediately accessible.

The system also produces shop orders containing detailed job instructions. When the job has been completed, shipping papers and invoicing documents are printed. "Keeping on top of each job is just plain good practice," Crow pointed out. "Like any business, we want to realize a payback on investment as quickly as we can, and the terminal systems are helping us write an invoice as soon as a part leaves the door."

Crow noted that the nature of the product causes the company to tend to ship mostly over the last 10 days of the month, and this creates a peakload situation.

"People used to sit here for days typing up invoices. But now, by the end of the first working day after shipping, we have the invoices in the mail, and our sales books are completely updated with necessary information transmitted to corporate headquarters," he said.

Automatic Timekeeping

An added feature of the Sycor terminal equipment was realized when the Lima and Fostoria Plants converted to a "guardless" turnstyle security system in which employees' plastic identification badges used to key the gate could be coded and used for automatic timekeeping.

Cassettes at the turnstyles now record employee name and badge number, date and time of day, station number and direction of passage whenever the locking solenoid is activated to permit entry. Periodically, information from the cassettes is transferred to a disk file on the 440 terminal.

Data is then relayed from disk to the central processor. "After we have the data on disk," Crow explained, "we use it to determine who's absent or tardy and to calculate the hours each employee spends in the plant."

The company considered putting communications onto the Honeywell central processor. However, this would have been prohibitively expensive, Crow said. "We realized that our 440s were technologically more advanced and that they could be made to emulate an IBM 2780 or any other kind of machine, for that matter. This was simply another way that we are using the systems' flexibility."

All terminals have been readily accepted both in the satellite plants and in the Lima data center. "Our people at the data center, as well as in the plant, really like it. But the thing that has helped us most is the ease with which new operators quickly master the system. The equipment has a very short learning curve compared with what we've used in the past," Crow noted.

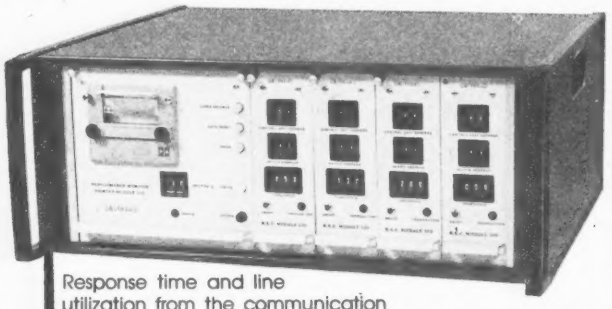
Lobby ATMs Scoring Big

(Continued from Page S/13)
network in Iowa. Moreover, through the computer switch provided by the Iowa Transfer System (ITS), MNB "Instant Access" customers may use their plastic cards at more than 100 sites throughout the state.

The rationale for MNB's stance regarding electronic banking was summed up in a recent annual report by F. Forbes Olberg, MNB executive vice-president, who is also board chairman and president of Banks of Iowa. He said: ". . .If you analyze the system of distributing financial services, it is obvious that continued inflation, increased labor costs and the demands of the public will call for great changes in the banking industry.

"The luxury of highly staffed banks and branches will give way to customer-activated electronic service centers. The elaborate brick-and-mortar installation of today will, to some extent, be replaced by 24-hour automated teller units located in high-traffic areas."

NEW PERFORMANCE MONITORING SYSTEM



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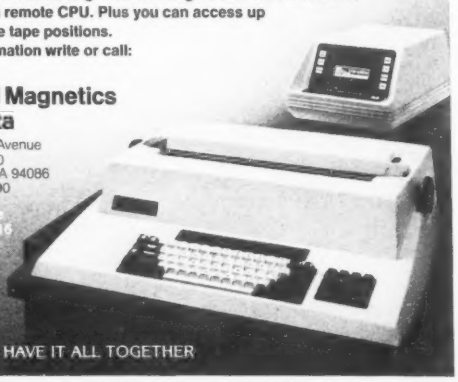


OUR TERMINALS HAVE IT ALL TOGETHER

CRTs Tied to 14 Warehouses

Auto Parts Stores Avoid 'Out-of-Stock' Status

DALLAS — Auto parts suppliers often must stock more than 100,000 items in a store that can only accommodate 15,000.

The solution: a computerized network that gives parts suppliers access to inventories at regional warehouses so they can avoid "out of stock" conditions.

Presently, more than 400 auto parts jobbers, spanning a 12-state area, are taking advantage of such a system, thanks to General Automotive Parts Corp. (GAP) headquartered here.

The company provides its jobbers with a system called the Jobber Order Entry and Inquiry (JOEI) that is based on CRT terminals. The system gives every store access to inventory at one of 14 warehouses, each of which maintains approximately 100,000 different auto parts.

"Within seconds a jobber can verify the availability of parts not in his own stock, place orders and check the shipment progress of supplies previously ordered," according to Bob Gant, DP customer service manager at GAP.

Emergency Orders

The system consists of an IBM mainframe at central headquarters in Dallas linked to a Lear Siegler, Inc. ADM-3A CRT terminal at each store.

"We needed a more efficient system for jobbers to place emergency orders for parts not stocked in their store," Gant said. "We began to install JOEI in 1977 as a service to the 40 auto parts stores owned by General Automotive Parts and many of the other 775 jobbers that are already tied into a computerized inventory control system provided by GAP. To date, approximately half of the jobbers have the JOEI system."

Previously, jobbers had to place emergency orders by phone through operators in each distribution center. "The unavoidable inconvenience of this arrangement included reaching a busy signal, getting a bad connection or being put on hold. In short, we were all wasting a lot of time," Gant recalled.

Ordering Via CRT

"Now, if a store is out of a certain part, the salesperson can order from the distribution center nearest his store by going to his CRT terminal and calling the mainframe computer on a toll-free In-Wats number. The salesperson then types the desired part number and distribution center on the terminal's keyboard.

"The terminal will receive in seconds the name of the distribution center and the date, time and reference number of that transaction from the mainframe," Gant pointed out.

"It then displays the information the salesperson needs: whether the part is in stock at his nearest distribution center, the cost per unit and any part number revision.

"The salesperson indicates whether he wants to place the order and, if so, how he wants it shipped, resulting in a purchase order printed out on the distribution center's printer. In most cases, the shipment can be delivered the same day."

The network includes 28 In-Wats lines to the Dallas DP center, and the CRTs are connected to the dial-up facilities using Vadic Corp. 317s acoustically coupled modems. Data is transmitted at 300 bit/sec in full-duplex mode using Ascii code.

'Now, if a store is out of a certain part, the salesperson can order from the distribution center nearest his store by going to his CRT terminal and calling the mainframe computer on a toll-free In-Wats number.'

At the DP center, the incoming data is handled by a Memorex Corp. 1270 terminal controller which converts the Ascii transmissions into Ebcdic format for entry into an IBM 360/65 mainframe.

Parts order information is transmitted from the Model 65 to the parts warehouses where Mohawk Data Sciences Corp. and Four-Phase Systems, Inc. minicomputers keep inventories up to date.

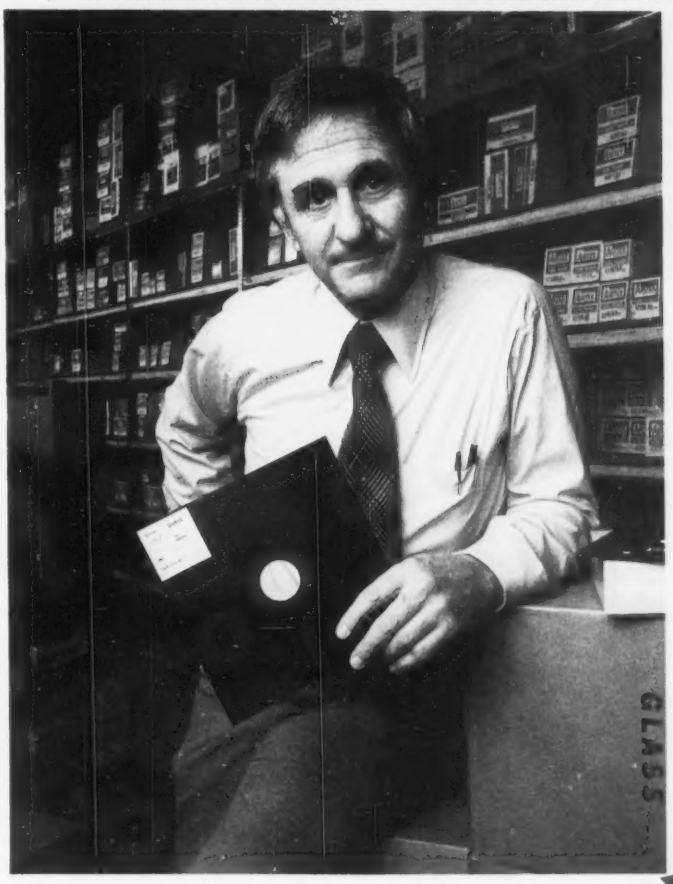
Gant stressed the significance of part number revision because a salesperson may be ordering an obsolete part without realizing it or he may already have the part in stock under an old part number. The updated information enables the jobber to keep his own inventory current.

"No verbal communication is necessary between the store and the distribution center," Gant noted. "The central computer transfers the order to the warehouse's printer. The parts are then manually pulled from stock and shipped according to the jobber's instructions."

Each parts store receives a monthly statement for all orders shipped from

(Continued on Page S/26)

"Our inventory is our existence. Think we'd trust it to anything less than Scotch® Brand Diskettes!"



Don Stone, Vice-President, Mass. Auto Supply Company, Inc., Boston, Mass.

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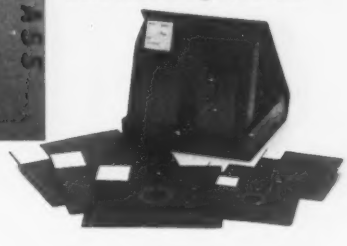


3M

Market Research Firm Using Satellite Link

SAN FRANCISCO — A computer services company specializing in market research has ventured into the space age with satellite communications. "People in the market research business want answers fast," according to Leif Gjestland, president of Computers for Marketing Corp. (CFMC).

As part of its services, CFMC is leasing satellite communication lines from RCA. Data is transmitted via 4,800 bit/sec Codex Corp. modems that operate on satellite facilities to link the company's Hewlett-Packard Co. (HP) Model 3000 mainframe in San Francisco with card-reading and printing terminals at remote client sites.

Information travels from the customer to an earth station, that relays it to the satellite. Another earth station near San Francisco then picks up the message and sends it over hard-wire using Bell modems to CFMC's site.

The Codex modems have the capability of voice-over transmission as well as data transmission. A knob on the modem triggers a bell at the other end of the line for troubleshooting discussions.

At CFMC's Los Angeles branch, one HP 2640 remote job entry (RJE) terminal and three low-speed teletypewriters are connected to the CPU in San Francisco by a multiplexed 7,200 bit/sec microwave circuit. This enables customers in Los Angeles to obtain the same service as those in San Francisco by dialing a local Los Angeles telephone number.

Using Surveyor, a statistical package developed for market research studies 10 years ago, and the satellite communications system, CFMC processes data for a wide variety of major corporations scattered around the country.

These include Datsun in Los Angeles, Levi Strauss in San Francisco and Quaker Oats in Chicago.

Clients use CFMC for a broad range of services from initial design and layout of questionnaires to statistical processing of the data and final reporting of the results in a form tailor-made to their specifications.

Switch to In-House System

CFMC recently switched its DP work from a service bureau to its own in-house system. In choosing the HP 3000 Series II system, the company did an analysis of costs and future plans.

Gjestland and his staff chose the HP 3000 series over mainframe because of shorter turnaround, he said.

"On a large fast computer, there are 250 jobs ahead of you at the service bureau. Eventually you get in and it may take only 10 seconds to run the job, but you don't get the work back for half an hour.

"On the mini, it may take two and a half minutes to run the same job, but the important thing is that we get the job back in five minutes," Gjestland said.

At the same time, if anything goes wrong, the company has the computer and can do something about it. "We have control over our own destiny," Gjestland pointed out.

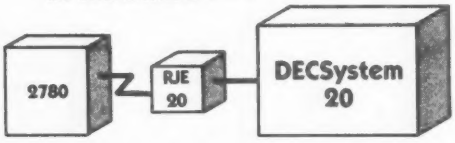
Interactive Interviewing

Looking toward the future, CFMC plans to expand its services beyond DP into data collection. The company has developed a program, Survent, through which an entire questionnaire can be set up in a CRT terminal.

All stages of a survey — the questions, responses and cleaning of data for errors — are stored in the terminal, eliminating the possibility of entering incorrect information.

CFMC claims it is the first company in the country to have developed an interactive interviewing system, interactive tabulating and batch processing all on the same type system.

Before you invest $50,000 in hardware . . .



RJE stations have been a way of life in the IBM world for many years. Now ICI's RJE-20 subsystem makes RJE available on the DECSystem-20.

The RJE-20 is a device that allows a DECSystem-20 to communicate with a 2780-like remote station. The subsystem consists of: 1) a micro-processor that is linked between a modem and the communication front end processor and, 2) operating software that accomplishes the command functions.

RJE-20 supports line speeds from 2400 to 9600 baud, operating in a full duplex mode. The software operates under the TOPS-20 operating system (Version 3 or later).

To arrange a demonstration, call Bob Henry, today!

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Three DP Facilities Consolidate

(Continued from Page S/6)

allowed Sun Life to establish a microwave data link between Baltimore and Atlanta and begin operations almost as soon as the move was complete. And as far as Hiatt and Dabich know, users in Baltimore don't notice the absence of the mainframes.

Sun Life has added six CRT terminals to the setup in Atlanta. In addition, PIX II has performed almost without a flaw since its installation, with "virtually 100% uptime," according to Dabich.

Total financial savings are still being calculated. However, Dabich is certain that his ability to achieve consolidation in Atlanta in 1978 rather than in 1979 has saved the company money.

In addition to eliminating the need for large hardware purchases and increased programming time, PIX II has also allowed Sun Life to use fewer, less expensive transmission lines than traditional methods require.

At this time, the PIX II system consists of an LCU, an RCU, two printers and a tape drive with the LCU and RCU connected by two 9,600 bit/sec voice-grade lines. The $4,800/mo cost of the system itself is about equal to the cost of the IBM 370X front end, according to Hiatt.

And the $948/mo line rental for two voice-grade lines is substantially less than the cost of four or five high-grade lines required by traditional solutions, he noted.

In the long run, the use of the PIX II may have its greatest impact on the company's growth policies. Plans are now under way to put the recently acquired Ohio company on-line, for example.

"We are acquistion-oriented," Dabich noted, and while the ability to link systems easily might never be the paramount reason for new acquisitions, it could be the deciding factor in specific cases.

CRTs Used For Analyses

(Continued from Page S/10)

lyze market trends as company president Bernard Moss began active trading on the stock, option and, later, the commodity markets.

CMT began with an HP 9830 desktop calculator and a mechanical graphics plotter, experimented with another vendor's graphics terminal for a few years but switched to the 2648 as the best match for the CMT-developed software.

"We are traders ourselves," Moss noted, "and we designed our system for other traders. We knew what information we had to have and so we chose a system that gives us rapid access to the data we need."

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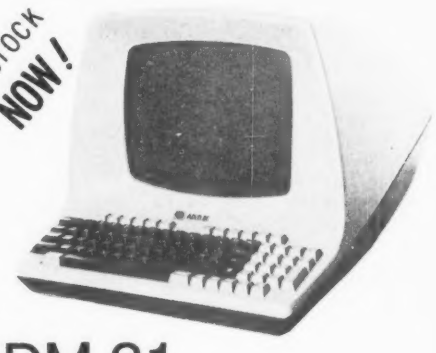

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Connected to NCIC, Nlets

Network Minimizes Danger for Iowa Police

DES MOINES, Iowa — The policeman emerges from his patrol car, ticket book in hand. He begins his long walk to the speeding car he has just pulled over. Who — or what — is waiting for him behind the wheel? The usual grumbling motorist — or perhaps an armed and fleeing felon?

If it happens in Iowa, chances are the policeman knows what to expect. Through information carried over the state's public safety communications network, he has already been alerted that the car is stolen, and he'll take all the proper precautions.

The Iowa public safety network has proven its worth many times in incidents such as this. Using the Iowa On-Line Warrants and Article (Iowa) file, state police and other public safety agencies are able to obtain timely, accurate data to boost their effectiveness in enforcing the state's laws.

Net Make-Up

The network consists of approximately 130 remote terminals located at police dispatch centers and public safety department offices throughout the state. Dispatchers and others operating the terminals send and receive important information to and from remote sites along the network as well as respond to officers' inquiries from the field.

In most cases, an operator can process an inquiry and provide the needed data to the inquiring station or officer in about six seconds.

Iowa is also linked to the National Crime Information Center (NCIC) in Washington, D.C., and the National Law Enforcement Telecommunications System (Nlets) in Phoenix. Through NCIC, users have access to national files on stolen firearms and property, stolen vehicles, wanted and missing persons and criminal case histories; Nlets allows motor vehicle checks, message switching and dissemination of data on a national basis.

Network's Nucleus

The nucleus of the Iowa network consists of three IBM 370/158 CPUs at the central site in Des Moines. Also located here is the main switching center for the network.

A pair of fully redundant Honeywell, Inc. 606 controllers handle all switching functions for in-state message traffic and the automatic polling of each remote station. Messages destined for out-of-state are switched to the Nlets DP center in Phoenix.

All communications is accomplished over four-wire dedicated lines from the 606 switching system. The network is configured on a multidrop basis with no more than 14 drops on a given circuit.

Each terminal operates in half-duplex mode, responding to polling from the 606 (request-to-send or request-to-receive) utilizing 8A1 line protocol.

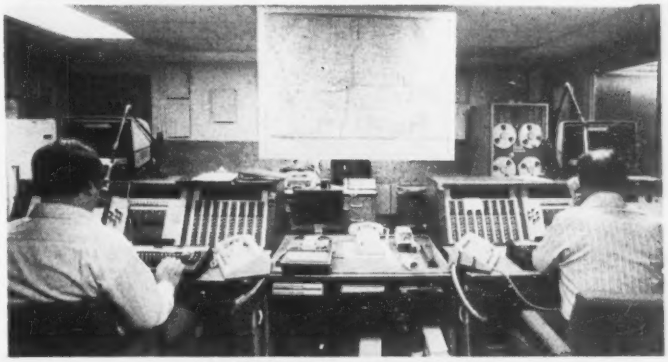
Terminals selected by the Iowa Department of Public Safety for use on the network are supplied by Racal-Milgo, Inc. Designed for stand-alone operation in a store-and-forward system, the units were installed beginning in June 1978 in a program to upgrade the state's low-speed Teletype Corp. system.

The change to Racal-Milgo terminals was made largely because of the lengthy response time of the former system — often as long as 30 seconds. The terminals have proven to be faster and more efficient, with a far lower cost per inquiry — approximately 10 cents.

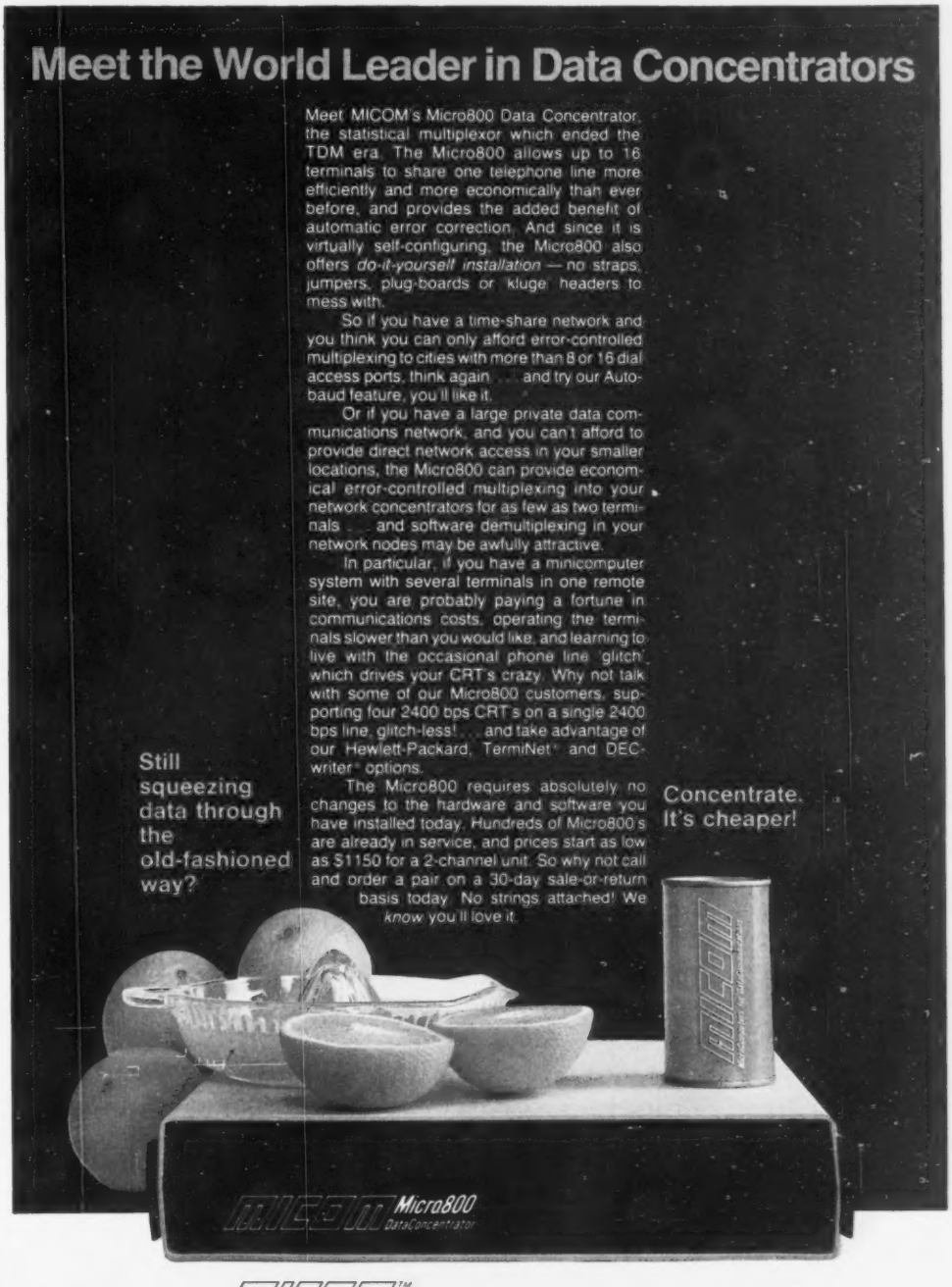
Dispatch Center Equipment

Data communications equipment in place at each dispatch center and other locations around the state consists of one or two Racal-Milgo 40+MPL CRT terminals operating in conjunction with two Racal-Milgo 40+20 line printers. These are linked to the central site and switcher via Racal-Milgo

(Continued on Page S/28)



Des Moines Police Dispatch Center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Meet MICOM's Micro800 Data Concentrator, the statistical multiplexor which ended the TDM era. The Micro800 allows up to 16 terminals to share one telephone line more efficiently and more economically than ever before, and provides the added benefit of automatic error correction. And since it is virtually self-configuring, the Micro800 also offers do-it-yourself installation — no straps, jumpers, plug-boards or kluge headers to mess with.
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Net Helps Electric Co-ops Coordinate Records

ST. PETERS, Mo. — A Midwest service center has brought DP services to 130 rural electric cooperatives stretching from Maine to Utah.

Founded in 1968, Central Area Data Processing Corp. (CADPC) supplies computer services to the cooperatives via its data communications network.

The services include work order accounting, material inventory, a transportation system, transformer loading, budget summary, labor distribution, on-line engineering, rate analysis summaries, capital credit allocation and retirement, material distribution, consumer billing, financial forecasting, preparation of reports required by the Rural Electrification Administration, payroll and general accounting.

The heart of the system is a Univac 90/60 with a main storage capacity of 1M byte, which was installed in March 1976 to replace an RCA Series 70/45. The 90/60 includes five Univac 8430 and 13 Model 8433 disk drives providing a total mass storage capacity of 2.8 billion bytes; six Uniservo 16 tape drives; three 2,000 line/min printers; and a multichannel communications controller.

'Because of the profit picture and size, it is virtually impossible for any individual rural electric cooperative to justify the costs of leasing or owning its own DP equipment. For these reasons, Central Area Data Processing was created as a common facility.'

The 90/60 uses the VS/9 operating system and has a high-speed memory with a cycle rate of 600 nsec.

The network includes four lines using the Uniscope terminal protocol, one line using the Virtual Integrated Communications Access Method (Vicam) and three lines using the Remote Terminal I/O (RTIO). Vicam is a communications software module designed for real-time applications, while RTIO is a set of modules that run under the VS/9 operating system for time-sharing applications.

The net also includes 18 teletypewriter-grade lines of which eight are on dial-up facilities and 10 on private lines.

The cooperatives are presently using a total of 150 Sycor, Inc. Model 340 and Model 350 CRT terminals to communicate with the 90/60. Each cooperative uses from one to four terminals depending on its size and the number of CADPC programs it uses. Another four Sycor terminals are installed at CADPC's computer center in St. Peters to receive data transmitted from the cooperatives.

Currently being installed is another 90/60 with a large network of Univac UTS 400 intelligent terminals. These terminals will shortly be replacing some of the Sycor terminals at cooperatives' locations.

Data Entry

Data entry for the programs is accomplished at each cooperative level using the CRT terminals, which are equipped with a set of transaction formats that have been programmed for both security and control of the data being keyed.

When the information is received at CADPC, it is edited to check validity before being processed.

John H. Mathews, general manager of CADPC, noted that "because of the escalating costs in every area of business today, it is incumbent on the electric cooperatives' manage-

(Continued on Page S/27)

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INDUSTRIAL DATA TERMINALS CORP.

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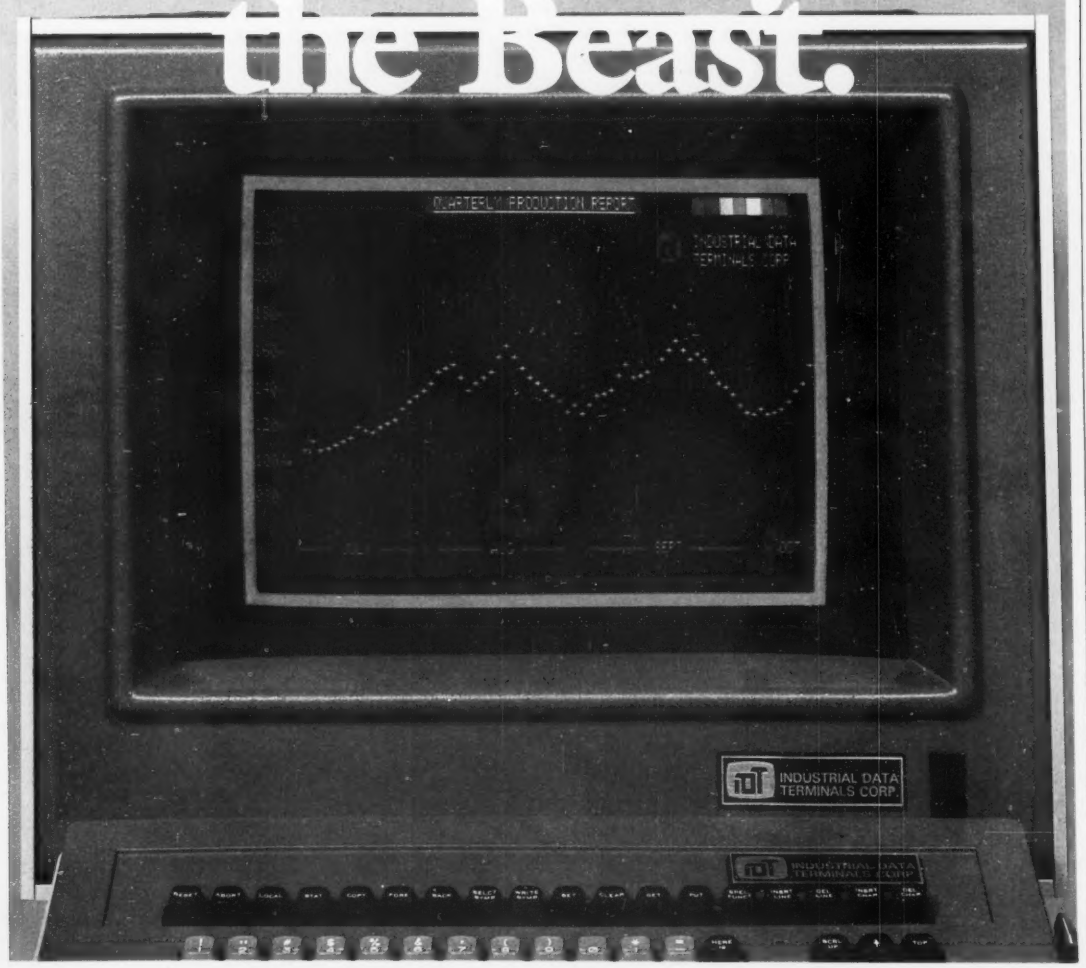


'We've Really Cut Down on Operator Input Errors.'

Mini Accessed Via Terminals

On-Line System Helps Students Select Colleges

WAYNESBORO, Va. — While parents of today's teens may spend hours poring over unwieldy college catalogs, their youngsters can access a DP file and get the same information in less time than it takes to go from homeroom to first period.

Developed by Time Share, Inc., the Guidance Information System (GIS) is making work easier for guidance personnel in more than 2,000 school districts across the U.S. By accessing the CPU through an on-line terminal, the student can get printouts of four-year

Jean Madren, a counselor at Montevideo High School, discusses college listing with Darlene Diehl.

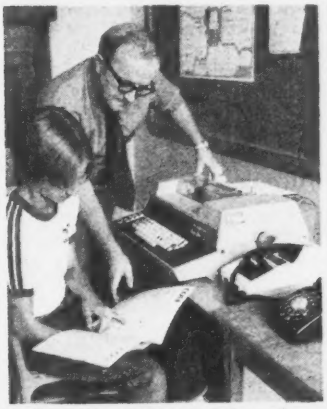
and two-year colleges, career profiles, sources for scholarships and financial aid and, for future reference, graduate programs.

GIS cannot make decisions for students, but it does provide information that can help them make better decisions for themselves when choosing colleges or occupations.

No Replacement

"A computer is no replacement for a counselor and a counselor is no replacement for a parent," according to David Houff, project director of Valley Vocational Technical Center in Fishersville, Va., where GIS files are stored on a Hewlett-Packard Co. 21MX leased minicomputer.

In Virginia's Shenandoah Valley, the latest GIS users include Harrisonburg High School and four Rockingham County high schools, all of which use General Electric Co. Terminet 30 terminals to access the computer.



Student Kris Kline gets help with research into four-year colleges.

"The only real problem was funding," Houff said, noting that it was easy to convince school officials that the computer was not a job threat and that the equipment couldn't be damaged nor files erased by over-eager students. "Schools budget a year in advance, so it took a special grant to get the necessary extra funds tacked onto the third year of our three-year grant under Title IV-C," Houff continued. Title IV-C is an education grant for innovative and contemporary projects funded by the Commonwealth of Virginia under the auspices of the federal government.

Costs to the user are minimal and represent a savings in man-hours. The user pays Valley Votech a predetermined annual fee for unlimited use. Users furnish their own terminal equipment and pay phone charges.

In addition to the hardware — a Terminet 30 printer and telephone coupler — each school purchased a GE maintenance contract and service manuals. The user has the choice of buying or renting the Terminet 30 teleprinter with coupler.

For schools that purchase the terminal, the cost is about $1,800 with a GE educational discount.

Before deciding on the GE terminal, the schools considered an NCR Corp. portable teleprinter. But the latter was rejected because roll paper was not considered as good as the fan fold paper used with the Terminet terminal.

It is up to the schools to work out a means of accessing GIS equitably. In Harrisonburg-Rockingham County, the five schools share two ports. Turner Ashby and Harrisonburg are on one, and Elkton, Montevideo and Broadway are on the other.

The latter three schools each use the computer two hours per day, rotating the specific two hours of use weekly, while Turner Ashby and Harrisonburg alternate mornings and afternoons.

All have an agreement to trade off their hours in special situations. In all cases, computer time is up for grabs

(Continued on Page S/26)

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- Keyboard/display mini-diskette, and communications interface
- Complete operating software
- Optional printer

The MDT-400 — a cost-effective, intelligent terminal — backed up by a nationwide service force of 300 service engineers. Manufactured intelligently by a large company you should get to know — Compugraphic.

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CW 379

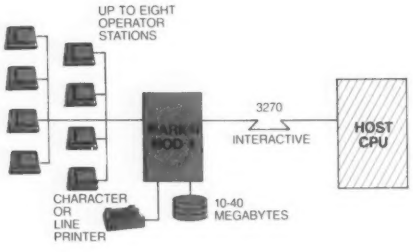
Raytheon's PTS/1200 MARK·I:

Tomorrow's distributed available right now.

You don't have to wait a year or two to obtain the power of a highly advanced distributed processing system.

Raytheon's MARK I distributed processing system is the choice of increasing numbers of sophisticated data communications network users.

And the reasons are many. Unlike some distributed systems, you can get a MARK I right now. When you get one, it will work right now—without reprogramming or conversion—on your host IBM mainframe. And with MARK I, you get a range of applications freedom unparalleled in today's data network market.



Thus, when you must configure systems to meet a variety of different needs at a variety of different locations, you can do so with speed, with simplicity, with modular power, and with more configuration options than other systems can offer. All for a starting price, including maintenance, of under $800 a month.

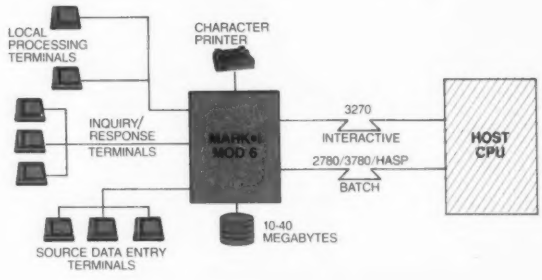
Here are just a few of the options you can install right now:

Option #1: Local processing and "intelligent 3270" functions

Every Raytheon MARK I system comes with two basic capabilities that many suppliers are still only promising. One is the ability to do stand-alone local processing. The other is the ability to perform intelligent 3270 on-line functions.

What is "intelligent 3270?" Just this: the ability to extend massively the capability of a 3270-type terminal network by adding advanced features to the network without systems change, **and without dependence upon the host processor.**

Features such as local format storage, local printing, local data base access, local transaction storage and back-up, and the ability to verify data—field-by-field, record-by-record—without going upline to the host mainframe.



These capabilities are inherent in the MARK I system. A 3270-type network user gets them immediately. So he can bring up local files, data entry functions, and either interactive or batch communications without complex changes to his network.

The key to intelligent 3270 operations is the MARK I's stand-alone processing capabilities. A powerful user-programmable controller supports from one to eight CRT operator stations, a 10 - to 40-megabyte disk data base, and a variety of printers and other peripheral devices. All systems and network communications software comes with every MARK I, so the user need only develop the applications programs he requires.

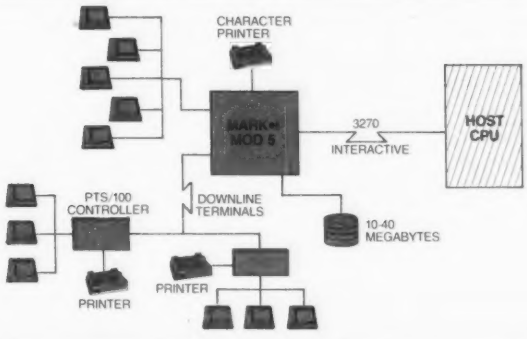
But Option #1 is just the beginning of what you can do for your network with a Raytheon MARK I. Check out Option #2.

Option #2: Interactive, batch and source data entry

The MARK I can become a multi-function workhorse in still another way. Start with its protocol emulators: 3270 interactive (dumb and intelligent), 2780 batch, or 3780 batch, or HASP remote job entry. On a single MARK I, you can run combinations of these emulators at the same time, allowing you to run both interactive as well as batch lines to the host CPU.

While you are executing both of those functions, a group of your operators can also perform source data entry functions on the MARK I. Our new Source Data Entry Package (SDEP) enables users to execute many functions not found in dedicated data capture devices. However, it also does classic data entry functions, such as: automatic cursor skipping; reasonableness checking; crossfooting and arithmetic computation; batch balancing; record searching by number, field or task; table look-up and record insert/delete.

processing options—



What is important to remember about this capability—once again—is that it is available **right now** on Raytheon's MARK I. You can install it today, and be using it tomorrow ...while you continue to execute 3270-type intelligent tasks and 2780 or 3780 or HASP batch-oriented tasks.

Not bad for one low-cost distributed processing system? Right. But now move along to Option #3. Because MARK I can do more than concurrent interactive, batch and source data entry functions.

Option #3: Downline terminals, "upline 3270" tasks

Look at the MARK I schematic. It illustrates still another configuration option of this versatile system.

That option is downline terminal support. What it means is this: that a MARK I controller, in addition to performing its basic local processing and upline 3270 data communications tasks, can also maintain control of a downline multipoint terminal network. Every MARK I can control up to ten drops on its downline link—under 3270 protocol, using Raytheon's powerful PTS-100 intelligent terminals in 3270-mode.

The importance of downline terminal support from a MARK I controller is the essence of any distributed processing system's ultimate value: the ability to offload busy, costly mainframe computers in the easiest, fastest, most cost-effective manner.

Let the MARK I, or a series of MARK I s, control the time-consuming polling of the 3270-type devices. Let the local MARK I data base provide the local formats and record storage facilities that now tie up the mainframe. And let the MARK I communicate upline, selectively, when it must support downline terminals by getting mainframe data for them.

The result: every component of your system, and all the operators it serves, work faster and better. And you can install MARK I systems today.

Option #4: Mix small or large systems on a single network

When you install a MARK I distributed processing system, you are still at the beginning of your network expansion capabilities. Because the MARK I offers a fast, totally compatible migration path to Raytheon's larger MARK II systems.

The MARK II supports multiple job streams. It has a data base capacity of 252 million bytes of local storage. It can support up to 24 operator work stations. Plus all of the protocols available on MARK I. Plus a HASP logical printer. Plus greater numbers of peripherals. Plus faster memories in support of higher speed operations.

And when we say the MARK I and MARK II are totally compatible, we mean just that. You can field upgrade a MARK I to a MARK II. Without alteration of your mainframe system, and without complex conversions.

Right now. Today.

CW 326

Tell me more about the Raytheon PTS/1200 distributed processing family:

☐ MARK•I
☐ MARK•II

☐ Have a salesman call.
☐ Send me more information.

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Title: _____

Company: _____

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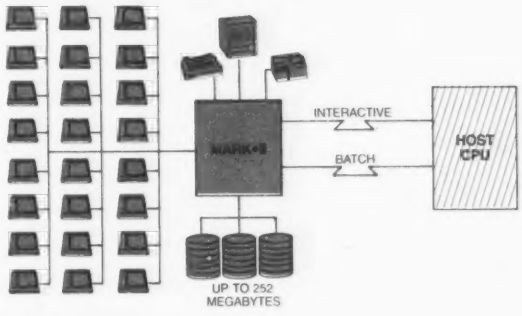
Raytheon terminals. 65,000 now, and growing fast.



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Auto Parts Stores Avoid Running Out of Stock

(Continued from Page S/19)

the distribution center. The statement is printed by the computer at the Dallas facility.

"Although all bills are mailed at the first of each month, it is really an ongoing process," Gant explained. "When a jobber keys in an order on the terminal and his inventory is credited with that part, the computer also bills his account. At invoice time, he is sent a computer-generated itemized statement for that month's accumulated amount owed."

Daily Captures

To keep track of the inventory of each distribution center, GAP's DP division captures all statistics on parts ordered and in stock at the centers on a daily basis. With a separate computerized inventory control system, the division produces purchase orders, monthly sales reports and forecasts for each distribution center in addition to actually transmitting most purchase orders directly to the manufacturer eliminating mail delays.

"The JOEI system terminal is all-important," Gant said. "It is the dealer's primary tool for placing special orders with the distribution center and therefore a principal means of effectively servicing his customers."

Being Particular

"We were particular about the terminal we purchased and conducted an analysis of cost and availability for a variety of terminals on the market, ultimately choosing the Lear Siegler ADM-3A CRT," he added.

"The major enhancement we have made to the system is programming that gives the jobbers access to all 14 distribution centers," Gant pointed out. "That practically guarantees the availability of any part. And we are continuing to expand the JOEI system at the rate of approximately 25 new stores per month."

System Helps Students Find Suitable Colleges, Careers

(Continued from Page S/23)

before 9 a.m. and after 3 p.m.

The process of using GIS is a process of narrowing options. It allows students to focus on the particular colleges that meet their academic needs and social interests.

For instance, if certain extracurricular activities, housing requirements or automobile restrictions are important, the list of appropriate schools can be narrowed accordingly.

Test Case

Lester Brantley, a counselor at Harrisonburg High, demonstrated a typical listing on the four-year college file (COL4) for a student interested in horticulture/plant science. The Terminet 30 printed out information on the 85 qualifying colleges and then showed that nine colleges qualified in the specified geographic area.

Lester Brantley helps first-time user Ginny Hoover begin her search for the 'right' school.

At this point, the student can select as many of the colleges as he wishes and can obtain printouts on each individual college by keying in the proper codes.

The four-year file contains more than 500 pieces of information on each one of more than 1,500 colleges and universities. The information is supplied by the colleges and updated annually.

Comparisons Easier

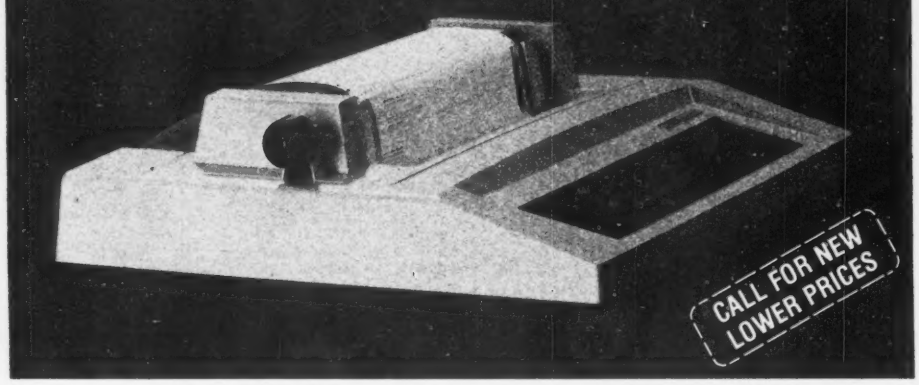
"A benefit we've found," Brantley said, "is that we can compare colleges side by side because the format is identical, whereas the college catalogs vary from school to school, making one-to-one comparisons difficult."

Three hundred characteristics of more than 1,200 schools are stored in the two-year file. The armed services (ASOC) file stores basic information on more than 100 military occupations.

"We encourage students to do their 'homework' and look up codes ahead of time so that they can come in, access the CPU and get the printout without tying up the Terminet teleprinter unnecessarily," Brantley said.

YOU MAY ALREADY OWN
YOUR NEXT 1200 BAUD DECWRITER®

UPGRADE YOUR LA36 TO STATE-OF-THE-ART
PERFORMANCE WITH THE DS120 TERMINAL CONTROLLER



FASTER—The DS120 prints at up to 165 cps and maintains true 1200 baud throughput. This translates into lower costs in computer time as well as time savings for you. A 1000 character internal print buffer virtually eliminates the need for fill characters.

SMARTER—Our microprocessor control "intelligently" optimizes carriage movement by printing bidirectionally and automatically executing high speed tabs over any blank spaces in the text.

MORE VERSATILE—We offer more standard features than any 1200 baud teleprinter currently available. A complete list of forms control and formatting features are programmable from the keyboard or via the data stream. The DS120 is equipped with both an EIA RS232-C interface and a 20 mA Current Loop interface. The unit communicates using the 128 character ASCII set at baud rates from 110 to 4800. Full-duplex, half-duplex and echo-plex modes may be selected from the keyboard. The controller supports half-duplex transmission using both coded-character turn-around and reverse channel protocol.

EASY TO INSTALL, EASY TO USE—The DS120 replaces your LA36 logic card in a matter of minutes and is fully compatible with the existing electronics. A comprehensive User's Manual provides detailed instructions for installation and operation.

RELIABLE—Our performance and reliability have been field proven in over 1200 installations.

INEXPENSIVE — BUT NOT CHEAP—Although the DS120 is just about the lowest cost way to print at 1200 baud, we don't cut corners on quality. The DS120 is built for years of service using pretested, high reliability components from leading manufacturers. Each unit undergoes a 48 hour test cycle before shipment and carries a 90 day warranty on materials and workmanship.

AVAILABLE - We can deliver . . . typically within 30 days after receiving your order. Our stocking distributors are conveniently located in major cities throughout the U.S. for even better delivery.

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New York	212/391-2957	Michigan	517/753-0185	Montreal	514/288-8784
New Jersey	201/664-1050			Toronto	613/226-2340
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DECWRITER® is a registered trademark of Digital Equipment Corporation. Installation of the DS120 will void any DEC warranty or service contract.

Supports 130 Participants

Terminal Net Helps Co-ops Coordinate Records

(Continued from Page S/22)
ment to find the most efficient and cost-effective methods of administration.

"Because of the profit picture and size, it is virtually impossible for any individual rural electric cooperative to justify the costs of leasing or owning its own DP equipment.

"For these reasons, Central Area Data Processing was created as a common facility which is owned, operated and controlled by its member participants," he said.

Principal Programs

Among the principal programs developed by CADPC is a work order accounting system, which is a time-saving development of the data required on Rural Electrification Administration Form 219. This system automatically accumulates payroll, material, transportation and overhead costs from the appropriate systems and applies those costs to the associated work order number.

The transportation system was designed to accumulate complete operating expenses of a cooperative's owned vehicles. Current month, year-to-date and lifetime expenses are detailed for each vehicle to allow for an overall determination of expenses. At the end of every month, each cooperative receives a transportation operating report, a transportation department report and a transportation summary.

CADPC's Capital Credit System provides the mechanism for allocating capital credits, refunding capital credits and preparing refund checks with very little intervention required.

The Materials Inventory and Work Order Distribution System is used for providing an accurate and timely procedure for controlling inventory and work orders associated with material stored in warehouses. It allows a cooperative to maintain control of all material activity in its warehouses.

CADPC has also developed a family of engineering programs to run line loss and voltage drop, fault current and capacitor placement studies. These programs are available to cooperatives that have resident engineers and also to consulting engineering firms.

Consumer Accounting includes in the billing system a preliminary billing calculation to spotlight possible error conditions prior to actual billing. It contains 11 separate areas; an open balance register with current 30-, 60- and 90-day balances; and a billing register in both hard copy and microfiche.

CADPC has developed a computer model allowing utilities to obtain Class Cost of Service information suitable for presentation to public service commissions. This system allows the analyst at a terminal to model any given number of cost-of-service allocations and perform thousands of calculations in a few minutes with guaranteed accuracy and repeatability.

'The work order accounting system . . . automatically accumulates costs from the appropriate systems and applies those costs to the associated work order number.'

Such flexibility gives the analyst freedom from making arduous and time-consuming allocations and gives him the opportunity to explore several ways of distributing costs.

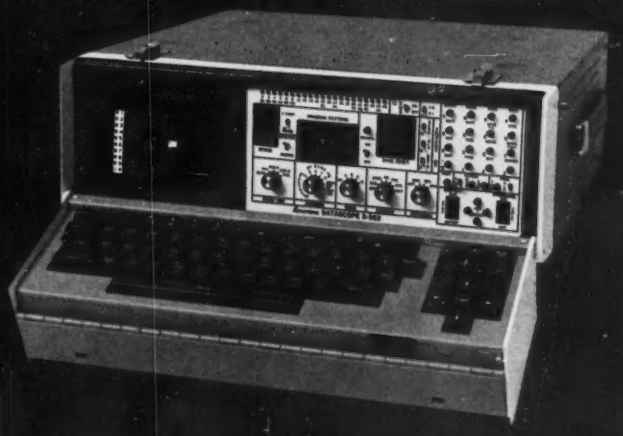
Among other packages offered by CADPC is a 10-year financial forecast program, a payroll system and a labor distribution system.

At present, most of the reports generated at the DP center are sent manually to the cooperatives. But when the Uniscope terminals are in place, much of the output from the center will be transmitted directly to the cooperatives using the network, according to a spokesman.

Put your network to the test.

Solve your data communications problems with the Spectron D-502B DATASCOPE

Three capabilities in one instrument
- It's a data monitor
- It's a powerful data analyzer
- It's a truly interactive data simulator and tester



Now you can have all three capabilities in one instrument — without sacrificing performance, making operation too sophisticated, or adding unduly to cost. ☐ A decade of experience in building the industry's most widely acclaimed data monitors has enabled us to develop an instrument which is both simple to use and universal in its application. ☐ As a monitor, it will help you isolate software, hardware, and communications problems, quickly and easily. ☐ As a data analyzer, it will make important measurements of line utilization, response times, block error rates — and many more — with equal facility. ☐ As a data simulator and tester, it will allow you to test new software without tying up communication facilities; test and debug new lines, modems and terminals off-line without risking adverse effects to the on-line network; or test your lines dynamically, varying response times, data rates, etc. to determine the most economical and reliable way to optimize network performance. ☐ Best of all, this capability is available in an instrument which can be used as easily by operating and field service personnel as by programmers and engineers. Without need for the highly trained equipment specialists, you get full value from a Spectron D-502B DATASCOPE.

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Erase: End of line/field, End of Memory.
Screen Size: 6" or 9"
Operating Temperature: 0 to 50 degrees C.
Refresh Rate: 60 times per second
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Network Makes Police Job Safer for Iowa Officers

(Continued from Page S/21)

Coherent DAM-5C asynchronous modems (compatible with Bell 202T) operating at 1,200 bit/sec.

In the dozen or so locations where two terminals are used to handle message traffic, both operate concurrently, with one serving as a backup unit should problems occur.

The two printers at each location carry out independent functions; one is used to record and log all messages that are received and sent by the terminals and the other prints selected CRT data.

The 40+MPL was designed for real-time transmission of message traffic and inquiry/response applications. The terminal is functionally and operationally compatible with the Teletype Dataspeed 40/3 terminal equipped with a Teletype Model 9140 station controller.

Special Diagnostics

Special line monitor diagnostics enable operators to detect transmission problems without interrupting normal operations.

The 40+MPL terminals can operate in any of four modes — send, receive, local (data entry on CRT only) and local print (data from CRT). The terminals have the capability to hold an incoming message when the operator is involved and to accept the message when ready at the touch of a keyboard button.

Dual buffering permits the 40+MPL terminal and 40+20 printer to be operated simultaneously. Thus, while the operator is sending or receiving data over the CRT, a message or log report may be printed at the same time, ensuring minimal downtime and increased operator efficiency.

The terminal operator can call up 60 fully formatted screens on the CRT to handle the most frequent data base inquiries — wanted/missing persons, stolen vehicles, drivers license verification and automobile registration checks. The entire Iowa network sends and receives nearly eight million messages per year, with these four categories constituting the vast majority.

In responding to an inquiry from an Iowa police officer, another state or Nlets, the terminal operator can access the Iowa data base directly for the needed information. The data is then relayed to the inquiring station or officer or sent out with a group code to a number of remote terminals in a particular region of the state.

A total of 13 groups codes are utilized on the Iowa network to specify any one of nine state regions as well as Interstate-35, Interstate-80, all public safety department communications terminals or state patrol administrative terminals.

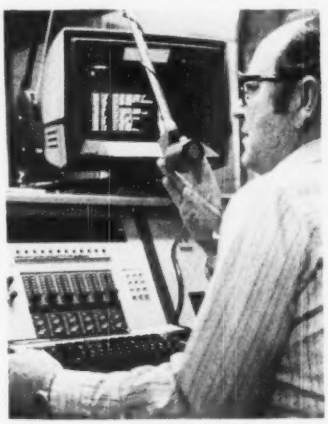
Watchdog Timer

For the protection of the individual police officer, the 40+MPL terminals at the Des Moines state dispatch center utilize a watchdog timer that is automatically enabled when a certain police code that indicates a present or possible offense — known as a "10-signal" — is radioed in and received by the dispatcher.

For those situations where danger is possible, which constitute about 15% of the 10-signals, the police officer must radio his status to the dispatcher within five minutes after initiating the call.

If that does not occur, the timer expires and the dispatcher attempts to contact the officer. If the dispatcher cannot establish contact, he notifies the shift supervisor, and assistance may be sent as the situation dictates.

After sundown, when darkness adds another element of danger, the police officer is also required to report his status at least once an hour to verify his safety and location. Failing to report to the dispatcher within that period results in a visible alarm being flashed on the CRT of the 40+MPL.



Status codes and radio inquiries from officers are acknowledged by the dispatcher, keyed into a terminal and logged for record purposes.

At that time, the dispatcher attempts to contact the officer. If he receives no answer, he calls the shift supervisor for possible follow-up action.

A total of 144 separate programs are needed to handle all of the applications in which the 40+MPL is involved, ensuring that the network operates smoothly and efficiently and guaranteeing the well-being of the officer in the field.

More Crimes Solved

While it is still too early to quantify the effect of the new terminals on Iowa's crime rate, officials at the state's Department of Public Safety believe there has been an increase in the overall number of crimes solved since the system became operational. The most significant and noticeable difference is in the area of automobile-related crimes.

Planned terminal installations at 18 more law enforcement agencies in Iowa will permit closer contact and increase the flow of usable data between stations. Several criminal justice agencies will also have access to the state's criminal case history files in the near future.

In addition, the Racal-Milgo terminals themselves can be adapted to 2,400 bit/sec operation for more efficient line use as message traffic increases. The Iowa network and the operational capabilities of its equipment are geared to accommodate the state's present communication needs as well as those of the future.

Service Offered Nationwide

Yachtsmen Aided in Search for 'Dream Boats'

FORT LAUDERDALE, Fla. — Besides searching through oceans of yachting books and traveling to distant docks, new or old "salts" can locate the boat of their dreams through a computerized yacht searching system that lists everything from small pleasure boats to large commercial vessels.

The Yacht Exchange, Inc., based here in central Florida, uses a Datapoint Corp. Datashare system to offer a national multiple listing and exchange service for people who wish to buy or sell yachts and other pleasure and some commercial boats. Data on yachts available or wanted is entered into an on-site computer at the Yacht Exchange's headquarters via local terminals associated with the Datashare system.

The company also maintains terminals in the offices of yacht brokers in several other cities through which data on yachts available or sought can also be entered into the home office computer via standard telephone service.

The Yacht Exchange uses a national In-Wats service, over which the bulk of the company's inquiries and referrals are transmitted. Other traffic is carried by mail, and individuals can even stop in at the Fort Lauderdale office.

While much of the traffic is generated by professional yacht brokers, there are also a substantial number of calls from individuals concerned with selling their own boats or acquiring one.

Serves 1,000 Brokers

Currently, the Yacht Exchange provides service to almost 1,000 brokers all over the U.S. and maintains information in its files on thousands of boats.

Data on boats wanted or for sale is constantly changing, of course, as transactions are made. This means the files are never static and answers to information requests need to be based only on the most recent information. The system is geared to provide completely current information simultaneously to multiple inquiries from many different locations.

The exchange, which employs 11 people, has about 350 corresponding brokers who send information on a continuing basis.

In some cases, where there is a heavy volume of traffic, brokers have installed, under the auspices of the Yacht Exchange, a Datapoint 3600 CRT workstation and a printer in their own offices.

These units are connected via dial-up services to the Yacht Exchange Datashare system and enjoy the same access to file data as do the on-site units. The advantage of this approach is that the broker with a heavy volume of sales leads and inquiries can get instantaneous response to any questions he may ask of the central data file and can even produce a printed report on his own printer.

The Yacht Exchange receives hundreds of inquiries each month. These are handled by its dedicated staff of clerks who each have access to Model 3600 terminals. The units are equipped with a large CRT screen and full typewriter keyboard.

'The advantage of this approach is that the broker . . . can get instantaneous response to any questions he may ask of the central data file.'

These workstations communicate directly with a Datapoint 6600 Advanced Business Processor, which is the heart of the Datashare system. The system's peripherals include four mass storage disk units capable of storing up to 100M bytes (characters) of data on disk packs and a 300 line/min printer.

The staff of the Yacht Exchange can readily add new information to the boat listing file on terminals as it arrives over the phone or in the mail. As boats are sold or otherwise

(Continued on Page S/37)

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Fast-Food Firm Cooking Up Future On-Line Operations

NASHVILLE, Tenn. — With an eye toward a terminal-oriented future, a large and rapidly growing fast-food operation headquartered here has upgraded its central computing facility to handle the sales reporting needs of its more than 500 restaurants.

"Because profit margins in the fast-food industry are small, quick and accurate reporting of costs and revenues is essential," according to Jess Shearin, secretary and treasurer of Shoney's, Inc. "Costs for food, labor and supplies can get out of line very quickly," he noted.

Shoney's owns 221 restaurants and franchises 305 other fast-food establishments under agreement with the Marriott Corp. The food-oriented firm has also developed several proprietary restaurant concepts, has a number of subsidiary companies — including one that operates 20 Kentucky Fried Chicken outlets — and will be operating a chain of seafood restaurants in 23 states by the end of 1978.

Multiprogramming capabilities have made it easier for programmers to gain quick access to the CPU.

To accommodate its phenomenal growth and keep ahead of its flow of grilled and fried products, Shoney's recently upgraded an NCR Corp. Century 101 to an NCR Criterion 8550 processing system. "The conversion more than tripled our disk capacity," Bill Egan, DP manager, explained. "It allowed us to keep all of our major files on-line. We can use our multiprogramming capability efficiently because we can get to the random-access files whenever they are needed."

Data preparation is initiated by the restaurant managers. They send daily sales reports, cash deposit receipts and invoices by special delivery mail and courier services.

Prompt Reports

"Shoney's week ends on Sunday. By the following Friday, every restaurant manager has a report of that week's sales and costs. They can take corrective action if needed before the high-volume weekend business begins," Shearin said.

City, divisional and corporate managers also receive weekly financial summaries.

The ability to process each job on an as-required basis has also been a tremendous boon to Shoney's program-

(Continued on Page S/31)

Shoney's Criterion 8550 and five NCR 658 disk drives have speeded up processing turnaround.

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Fast-Food Outfit Cooking Up On-Line Future

(Continued on Page S/31)

ming supervisor and two programmers. Previously, they sometimes waited days to gain access to the computer. Now, the wait is never more than a few minutes.

The system operates in a batch environment, and its memory is allocated to run three programs simultaneously during the day shift and two on the night shift.

The weekly management report is one of several packages that has been developed or enhanced by Shoney's programmers and integrated into a comprehensive financial accounting system. More than 75% of all data is entered only once. For example, each restaurant's labor costs are entered into the payroll system, while its food and supply costs are entered into accounts payable.

The program taps these files to compile the weekly cost sheets and to update the general ledger system for monthly reporting.

The weekly sheets and the general ledger system summarize overall company operations for each level of management. A city supervisor, for example, can see how his restaurants stack up against those in other locations. Divisional supervisors receive a total consolidated picture of their operations. Each manager receives 65 financial reports annually, including the complete profit-and-loss statements generated each month.

The weekly reports help establish management goals and rewards. Bonuses are based on achieving certain objectives established by division directors on the basis of sales and costs related to the weekly sales level.

Last year, Shoney's revamped its payroll system to make the handling of bonuses and government recordkeeping easier and to incorporate tax changes.

The company now has more than 10,000 employees and operates in twice as many states as it did when the first payroll system was drawn up. Major new features include the ability to automatically compute overtime, even on monthly bonuses, control tip credits and maintain history files on individual employees.

"The files make it much simpler to transfer and rehire employees," Shearin said. "For example, if students have worked for us earlier in the year, we can pick up their previous earnings records and bring them forward on the same W-2 forms."

The payroll system also includes a skeleton framework for a personnel reporting system. "Right now, that feature helps us meet Equal Employment Opportunity reporting requirements. It will also be used to produce turnover statistics and to help automate certain personnel functions," Egan explained.

Fixed-Asset Reporting

In addition, the computer will be used for a fixed-asset reporting system. This will maintain corporate and tax depreciation records and verify that figures going into the general ledger are identical to those reported by the fixed-asset system.

"We already have more than $50 million in fixed assets, and we open an average of 30 restaurants annually," Shearin stated. "Computing tax depreciation was becoming very cumbersome. We could only do it at audit time and we couldn't really spare the time to spend the full week that manual effort required.

"The new system is much faster and will keep information current. Construction progress reports, which are one of the system outputs, will help us forecast our needs for funds and control construction costs as well," he said.

The computer will be used by the Nashville commissary in conjunction with an automated billing system. Orders are entered into a minicomputer installed at the commissary. The minicomputer prices, computes and prints all invoices. The same data is copied onto a tape fed to the NCR Criterion 8550. The latter generates sales and usage reports.

Management is currently studying a plan to link restaurants, commissaries and headquarters in an on-line, electronic environment.

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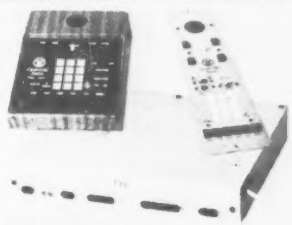

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Tool for Designers

Matrix Recommended for On-Line Controls

By Jerry Fitzgerald
Special to CW

A matrix approach can be used to design controls into data communications systems during the system development process. This article will describe a tool that can be used by system designers and programmers for implementing controls when designing on-line terminal systems or enhancing current systems.

The management of an organization is responsible for establishing and maintaining adequate internal controls. This duty, especially with on-line data communications systems, is a significant management obligation. This obligation has been delegated to the numerous system designers and programmers.

Recently, a number of developments have triggered increased interest in the subject of internal controls.

- First, explosive growth in the area of data communications technology is leading to wider use of DP by all sizes of organizations that utilize minicomputers and microprocessors.
- Second, dependence upon on-line distributed data processing systems has increased along with the recognition that DP affects every facet of today's organization in providing accounting, production and management-related information.
- Third, cases of alleged computer fraud or breaches of privacy have been widely publicized.
- Fourth, use of data communications and distributed DP systems has increased.
- And fifth, public accountants have emphasized internal control systems and organizations' internal auditors have stressed the importance of controls in DP systems.

Other factors have been the increased liability of directors and officers of organizations, the ever-growing number of audit committees at the director level and the very recent requirements of the Foreign Corrupt Practices Act of 1977.

System designers and programmers who design new data communications systems and enhance the current systems can use specific control guidelines during their design and programming functions. During the development of new systems, DP personnel are extremely busy meeting deadlines, designing the new system, developing system test standards, identifying system enhancements (even before the original system has been completed), testing the system and implementing it. Throughout, a set of control guidelines must be used to identify various types of controls that might be implemented at each stage of system design.

In the past, there has been no concise written set of controls cross-related to the various components of a data communications system. One approach the system designers and programmers might consider would be to utilize a matrix as shown in the figure on Page S/42.

The various concerns/exposures (potential threat areas or adverse occurrences that could hurt the organization) to which a data communications network may be subjected are listed across the top of the matrix. The various resources/assets (items that are being reviewed, such as computer hardware, software programs, operational policies or procedures, personnel and other tangible or intangible assets) that should be reviewed are listed on the left vertical axis of the matrix.

In conducting the control review, any resource/asset (left vertical column) that might be subject to a concern/exposure (top horizontal/row) should have some type of control/safeguard that must be evaluated and reviewed.

These controls/safeguards are represented by the number within the cells of the matrix, which correspond to the list of controls in this article. Therefore, if the concern/exposure was "message loss or change" and if the resource/asset being reviewed was "people," then the appropriate controls that should be evaluated and reviewed are listed by number at the intersecting cell of the matrix (25, 26, 28, 29). The controls, as numerically listed in the cells of the matrix, are as follows:

1. Have a general policy pertaining to the on-line terminal requirements and the uses to which these on-line terminals may be put.
2. Ensure that employees in sensitive positions are subject to special controls and especially a thorough review upon hiring.
3. Review insurance coverage with regard to the remote terminals and remote distributed processing sites.
4. Consider transaction coding the terminals so only certain application system transactions can be entered from certain terminals. In this way, the use to which a terminal may be put by its location within a specific work area can be restricted.
5. Consider using a departmental user number. This departmental user number is a type of security control, although it is known to all members of a specific department (it is primarily a number used for billing purposes).
6. Use an individual security code called a password. The password is a secret number known only to one individual user and must be kept confiden-

(Continued on Page S/36)

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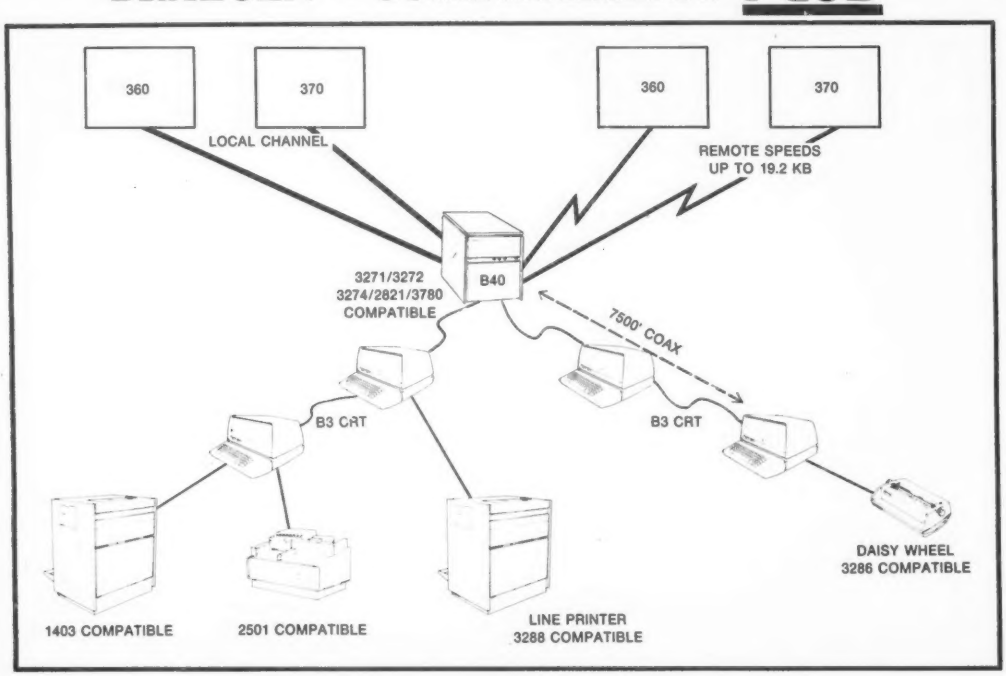

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2. Does a single device failure take your complete channel down?	☐	☐
3. Will remote communication speeds, switch selectable, up to 19.2KBS improve your network efficiency?	☐	☐
4. Do your programmers need more information displayed to efficiently develop and debug software?	☐	☐
5. Are there one or more special functions you need to make your job a lot easier?	☐	☐

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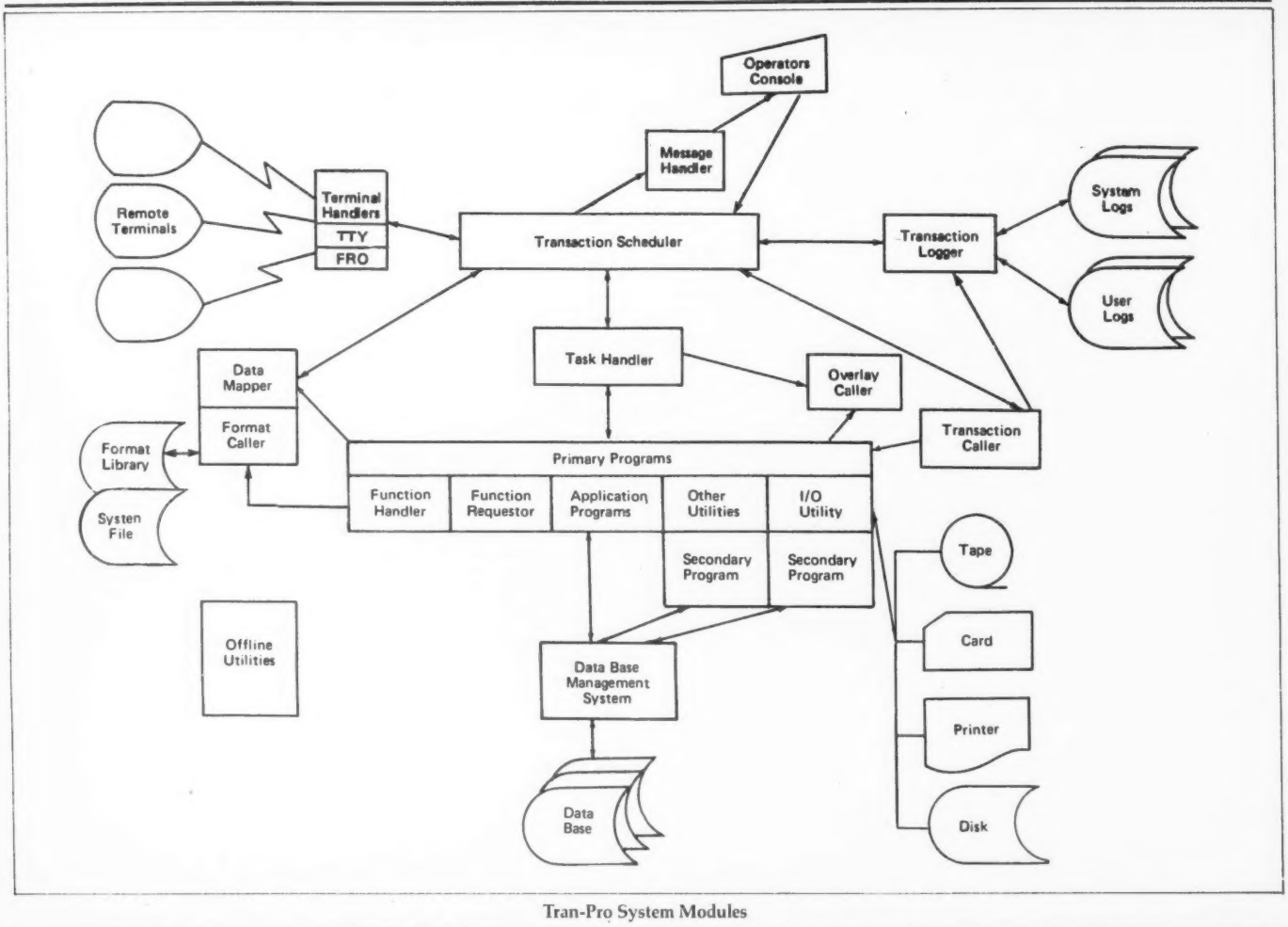

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- Input controls (Chapter 3)
- Data communication controls (Chapter 4)
- Program/computer processing controls (Chapter 5)
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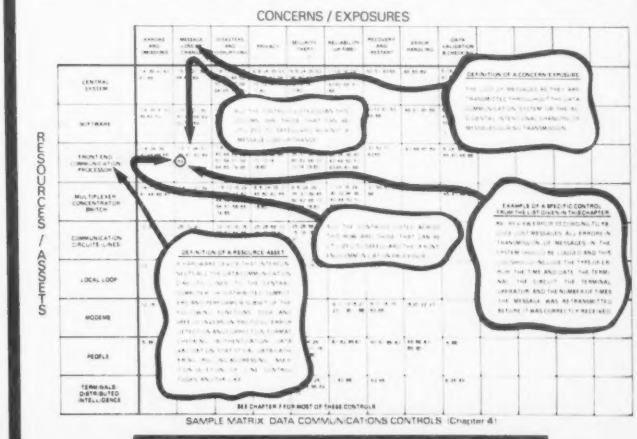

SAMPLE MATRIX: DATA COMMUNICATIONS CONTROLS (Chapter 4)

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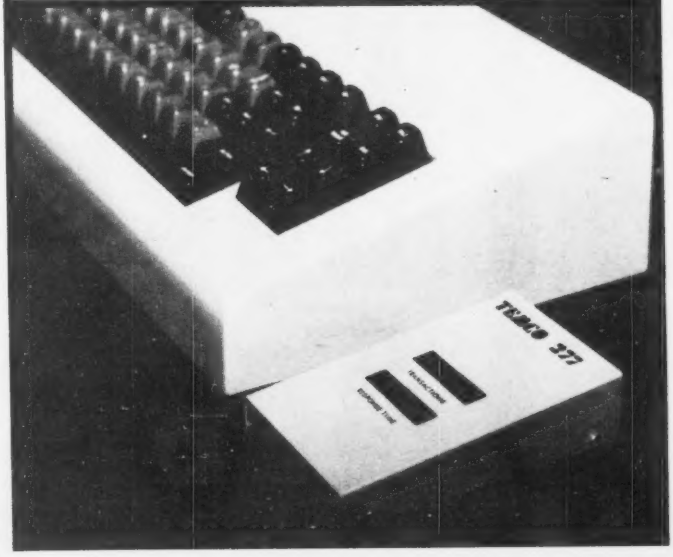


Transaction-Oriented Software

General-Use Package Eases On-Line Processing

By Barry Gilmore
Special to CW

On-line telecommunications networks promise myriad benefits in virtually every area of computer usage. But the widespread adoption of such processing has been inhibited by its complexity. Implementation has been both time-consuming and costly.

NCR Corp. has addressed this problem with Tran-Pro, a general-purpose, transaction-oriented processing system.

Various other hardware vendors — in fact, all of the major vendors except one — have long offered software support for transaction processing. But those packages have either been optional parts of data base management systems (DBMS), communications monitors or even operating systems.

Gilmore is NCR Corp.'s Tran-Pro product manager.

Tran-Pro is a separately supported, independent piece of software that has discrete interfaces to communications, files and operating systems.

Tran-Pro can be interfaced to NCR's version of Cincom Systems, Inc.'s Total DBMS, but it need not be. Users may also interface to their own DBMS.

In addition, Tran-Pro can be run in parallel, using the same data base, with Cincom's Interactive Query Language (IQL).

Data Mapper Function

Tran-Pro has at least one feature not found in the offerings of any other vendor. It is a data mapper function that provides input and output terminal data editing, screen formatting and data type verification.

"The application programmer can work without any consideration of the communications network. No code must be written for any of the transaction processing steps," an NCR spokesman said.

"Formerly, when you went to an on-line environment, you had to write separate protocols for each telecommunications device in each of the affected applications programs, according to the type of device — CRT terminal, teletypewriter, thermal writer or line printer.

Inappropriate Assignments

"The work usually had to be done in assembly language, which necessitated assigning the most skilled — and hence the highest-paid — programmers in a shop to a time-consuming and often boring job," the spokesman added.

"Because everything was interrelated, maintenance was burdensome and, again, expensive. Furthermore, if the network was enlarged or modified in any way, for example, by the addition of a new type of terminal, then the application programs had to be changed yet again."

In contrast, the NCR spokesman continued, the Tran-Pro applications may be written in either Cobol or NCR's Neat/3. Provision for new terminal screen formats can be made in 10 minutes or less merely by writing additions to the prestored format libraries that the data mapper draws upon, he said.

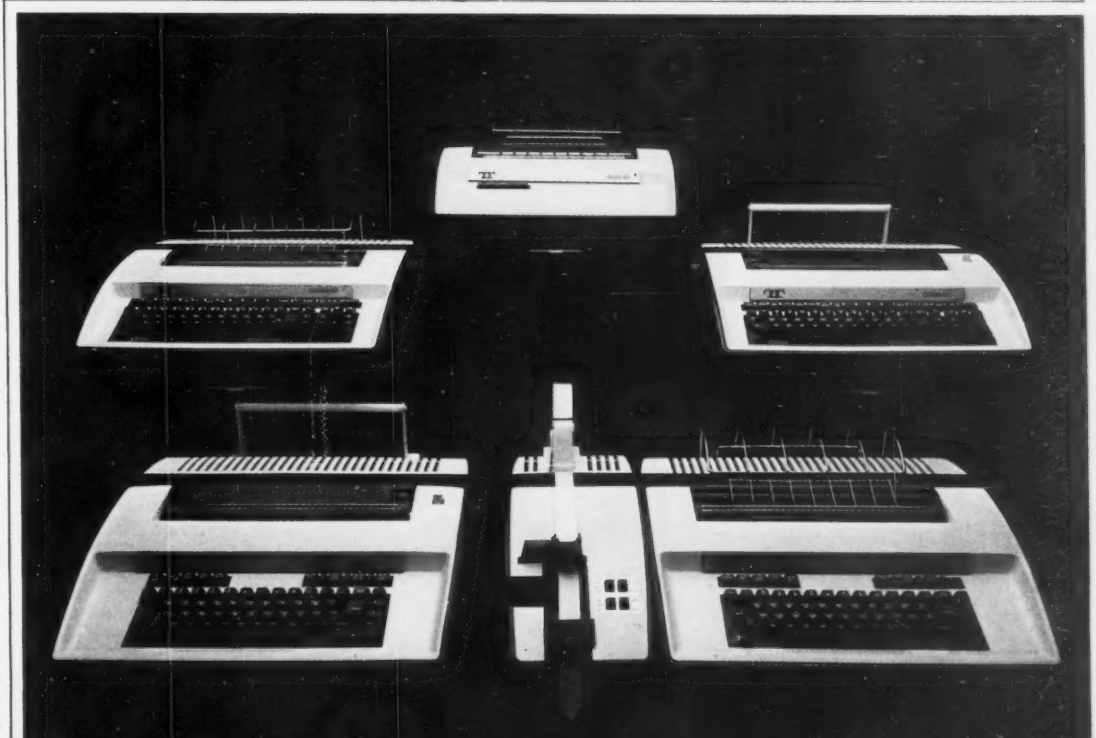
To illustrate what Tran-Pro can mean in terms of time savings, consider the experience of one user, Gilmore Steel of Portland, Ore. There 7K- and 8K-byte application programs are routinely written and debugged in one and a half days.

More Compact

Designed to handle up to 200 terminals processing as many as 10,000 transactions per hour, Tran-Pro is more compact than similar software. It only requires 80K to 120K bytes of CPU memory, whereas other systems require 1M byte of CPU memory.

The smallest configuration for the system is a Century 151 with a 192K-byte CPU to handle applications programs. The package can be run on all of the Century systems larger than the 101 through the Cen-

(Continued on Page S/38)



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Model 43's come in a variety of configurations with either 80 column friction-feed or 132 column pin-feed printers. Some units are designed for use on the switched network, others for point-to-point private-line systems. (There's also a new generation of 5-level buffered teleprinters for Telex applications.)

The basic model 43 series operates on-line at 10 or 30 cps in either the half- or full-duplex mode and prints multiple copies using the 96 character ASCII code set. A wide choice of interfaces, including EIA RS232C and DC 20-60ma, are available for easy system integration.

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On-Line System Controls Outlined in Matrix Form

(Continued from Page S/32)

tial. Passwords can be cross-related to terminal identification schemes and to application transactions for which the user is authorized.

Ensure that passwords are changed at various times and that the passwords of employees who leave the organization are immediately removed from the system. Also ensure whenever a central authority issues passwords that they are truly random, that they are printed and distributed in a secure fashion and that adequate measures are taken for their timely reissuance.

If the organization allows the users to develop their own passwords, ensure that there is a computer program to review each new password to see that it is unique and that it is not just a copy of the user's name, four or more similar characters or some other combination that is easily discernible.

One further point would be to ensure that the number of passwords being utilized is at a ratio of approximately 1 to 200 with regard to the number of passwords available (in other words, if there were 10,000 available passwords, be sure that no more than 50 are actually assigned).

7. Keep the remote terminals in a physically secure location so only authorized personnel can use the terminals.

8. Obtain terminals with keyboards that can be locked from the remote computer site or distributed intelligence in case the central control function desires to shut down a terminal.

9. Ensure that the terminals have a nonprinting feature for use when keying in the individual security code (password) so it cannot be seen by personnel in the area.

10. As an alternative to passwords, consider an identification card reader that would read the employee's badge; fingerprint detectors; handprint detectors; voice detection; or signature verification. The current state of the art and the current acceptance of the method by the public at large tends to lean toward signature verification as a personal identification device.

11. Even though terminals may be in a secure location, consider putting a keylock on the terminal's on/off switch. In this way, when the authorized operator leaves the terminal, it can be locked.

12. Ensure that the communications facilities, when they are shut down, are locked off in an inoperative state. This ensures that the terminal operator cannot gain illegal entry into the system during off-hours.

13. With regard to logging in a terminal, consider special log-in passwords (separate from the individual operator's password) that will be transmitted from the terminal to the central site or distributed intelligence for verification. Also consider having the central site or distributed intelligence send some sort of identifier back to the terminal operator.

14. Restrict some terminals to input only, output only or both input and output, as is appropriate with regard to the business application.

15. Restrict some terminals to the type of message that can be sent or received to or from the terminal.

16. Cross-relate the individual security code (user password) to the type of transactions that are authorized by this individual. In this way, an individual can be limited to the type of transactions for which he is authorized. This is a form of "electronic separation of duties" which can be very effective in restricting transactions.

17. Correlate the circuit identification (identification of the communications line) to the physical terminals or individual security codes that would be coming in on that specific communications circuit. This is another form of cross-relating an individual security code to areas where this security code is authorized.

18. When the terminal is allowed direct-dial access to the central system or distributed intelligence, consider some of the following controls: keep the telephone numbers secret and change the telephone numbers periodically; when the terminal operator dials in, have someone at the central site or distributed intelligence point make a verbal identification of the caller; have the central site or distributed intelligence record the caller's password and then return the call to the caller (in this way, the central site or distributed intelligence controls to whom they will return calls).

19. Sequence number all messages, both inbound and outbound, starting with message No. 1 each day. In this way, lost messages can be identified, as well as illegal messages in the message stream to or from the terminal.

20. Consider logging (safe store) all messages at the remote terminal.

21. Acknowledge receipt of all messages, either by the central site or distributed intelligence and by the remote terminal itself.

22. Use some sort of encryption or secret test keys to protect sensitive data within messages.

23. Protect the privacy and secrecy of passwords and log-in codes.

24. Whenever dial-up backup communications facilities are used, have the central site or distributed intelligence check to ensure that the private leased communications facilities have, in fact, failed.

25. Consider special control reports for terminal security and password security such as the number of log-ins or log-outs (especially unsuccessful log-ins), the sequence number errors in the message stream (report these immediately to the sending terminal and log it out), the number of unusual log-outs and where they took place, all alterations of previously entered messages, any messages left in the system at system shutdown and the like.

26. Consider some on-line daily reports such as the current message status by terminal, message delivery criteria, the current log-in/log-out status of all terminals and all individual security codes (passwords), all undelivered messages, total message count (both inbound and outbound) by terminals, and the like.

27. On very large systems, use a message priority structure for efficiency to ensure that the most important messages get delivered.

28. Ensure that there are message tracing routines (audit trail).

29. Ensure that there are message re-

(Continued on Page S/40)

National Service Lists Boats for Sale, Wanted

(Continued from Page S/29)
taken off the market, they are deleted from the files in the same fashion.

Typical Inquiry

Often a broker calls and seeks general information on boats in a certain category — say, diesel-powered, aluminum-hulled vessels between 50 and 60 feet long, located at an East Coast or Gulf port and priced at less than $125,000.

These parameters can be introduced into the system, which will search the files and locate the vessels filling those specifications. This selected information can be printed out on the system printer and mailed to the inquirer or in some cases simply called up on the screen of a 3600 workstation and read off to the inquiry broker.

There is no charge for this service to member brokers of the exchange and only a nominal charge for nonmembers. In fact, anyone who has an interest in yachts can make use of the services.

Information on boats contained in the files is comprehensive. It includes registered name, dimensions, manufacturer and type of engine. The boat is identified as being one of 17 model types and as utilizing one of five kinds of hull material.

Accessories Listed

Important accessories or options such as radar, loran and dual controls can be listed. Location of the boat, its condition, availability and listing price are also part of the data package. And finally, a special identification code completes the listing.

In business for more than two years now, the Yacht Exchange has greatly improved the flow of information within the boat marketing business. "The terminal system has allowed us to create a truly national market for the pleasure boat field. We do business now in just about every state, landlocked or on a major body of water," President Peter Kersten noted.

The Yacht Exchange makes available to its members a monthly summary printout of all boats sought or for sale. This serves primarily as a reference manual for general price ranges, styles and so forth for use by brokers and their customers while current "breaking" information on boat availability is normally derived from direct on-line inquiries to the exchange and the dynamic data file it maintains.

"Lead" sheets listing inquiries by individuals seeking particular types or styles of boats are also circulated on a periodic basis to all exchange members.

The Yacht Exchange activity was conceived primarily as a service to brokers, although private individuals also use it.

> *'The terminal system has allowed us to create a truly national market for the pleasure boat field. We do business now in just about every state.'*

"We do not sell boats," Kersten said. "We are an information center for brokers and we help them buy or sell boats more efficiently, but we do not get involved in the transactions.

"The terminal system has made it possible for us to offer a new and highly useful service to the entire yachting community," he said. "Now complete and timely information on the boat market for either buyers or sellers is just a phone call away from any point in the country."

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General-Use Package Aids On-Line Processing

(Continued from Page S/35)
tury emulating (N) and Virtual (V) Criterion 8400 and 8500 series.

The first Tran-Pro users are Gilmore Steel, which has a 768-byte Criterion 8550, and Bassett Walker, a textile firm in Roanoke, Va. which has a 768K-byte Criterion 8570. Gilmore uses NCR's Total and plans to install the vendor's Virtual Resource Executive (VRX) and On-line Program Development (ONLP), while Bassett Walker also uses Total and has already implemented VRX.

Table-Driver Software

The software is table-driven. All data, program, file, terminal and peripheral interrelationships are specified in tables that are external to the system itself.

Table entries are a series of pointers or addresses for system control. New terminals, peripherals, data elements and applications as well as changes in existing applications are accommodated by merely altering the affected table entries.

The package operates in either an on-line/real-time environment or a mixed batch and on-line environment, which permits users to bring up on-line applications while continuing to run concurrent batch jobs at low priority. In addition, batch work input can be collected in a log for later processing.

Central Control

Tran-Pro utilities permit bulk data input and output interfacing with magnetic disks, tapes, card readers and printers. Common file tables, buffers and I/O routines handle all of the functions necessary to get or create a record. This provides central control, eliminates duplication and simplifies programming.

Among the basic modules of Tran-Pro are:

- Terminal handling. This establishes and disconnects communications lines, receives incoming transactions, resolves transmission errors and, when processing is complete, prepares the appropriate output display.
- Transaction scheduling. This coordinates all of the other modules and ensures proper handling of the transactions. It verifies each input whether it originates from a remote terminal, a batch input device or an internal system module.

The subsequent routing handles queuing, while continuous monitoring of the operating system maximizes memory use and minimizes response times.

- Transaction logging. This records user-specified transactions and either sends them to the scheduler for immediate processing or retains them to be done later. The module handles all disk file reading and recording, including any required transaction buffering.

Functional Characteristics

Also recorded are all of the functional characteristics of network operation, such as number of good and bad transactions and response times.

- Task handling. This provides the interface between Tran-Pro and applications programs.

In an on-line, real-time environment, the module calls for the task or program needed to process a transaction, relieving the applications program of that job.

- Message handling. This oversees all communications between system modules or user applications and the system operator.

It is possible to send messages selectively to terminals or to broadcast to all of them. Terminals may also send messages to one another.

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For Administrative Jobs

Isle of Man Puts Smart Terminals to Work

ISLE OF MAN — Although their 227-square-mile home is located in the Irish Sea midway between the coasts of Ireland and England and their government is nearly 1,000 years old, this island's 62,000 inhabitants have submitted to the pressures of the 20th Century and replaced their age-old manual administrative system with a computer and intelligent terminals.

"We had to make our administration more efficient without expanding staff, and a computer became essential, particularly as it was our intention to become a financial center," William Dawson, treasurer of the Tynwald, the island's parliament, pointed out.

Although the island relies on Britain for external relations and defense, it has a considerable degree of autonomy and is responsible for all its internal affairs, Dawson said. The Isle of Man is a popular tourist resort — noted for its world-famous motorcycle races — and recently has attracted industrial and agricultural concerns as well as banking and trust administrations.

The Manx Government Treasury realized that the growth in administrative operations was becoming a burden to support without a large increase in manpower. Moreover, it was felt that numerous efficiencies could be obtained by moving to a centralized accounting procedure. Up to this point, each of the 20 Boards, or departments of the government responsible for such services as education, police and so forth, was writing and mailing its own creditors' checks.

In June 1975, a Univac 90/30 was installed in a section of the Treasury building in Douglas, the Manx capital. After enlargements to its original memory capacity, the system currently has a main storage of 396K bytes; four Univac 8430 disk drives providing a mass storage capacity of 400M bytes; a card reader; and a printer.

Presently five Uniscope 200 CRT terminals and two UTS 400 intelligent terminals are connected to the 90/30. These terminals are located in the Post Office, the Tax Office, the Assessment Office and the DP center.

In implementing the system, the Treasury required that the staff for the new computer facility be drawn from civil service personnel, who had the advantage of already being familiar with the various Manx local government operations.

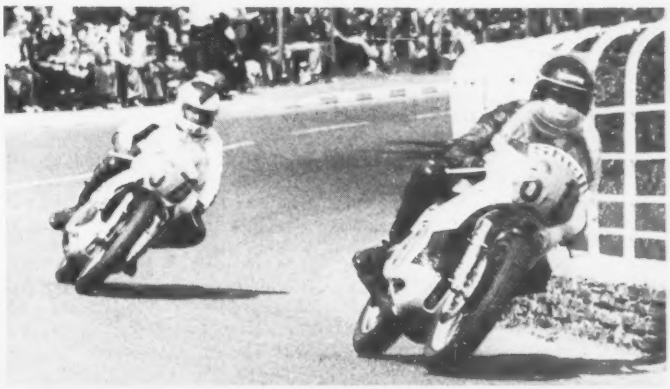
Other tasks handled by the 90/30 include an expenditure and income analysis for each of the Boards, billing for gas and water services and a population census performed every five years with the completed forms being analyzed statistically by the computer.

A property data base using the Univac Data Management System 90 (DMS 90) has been established. It lists all properties on the islands, their assessed valuation and the amount of taxes due. The annual real estate billing (known as rates) is sent out to some 25,000 property owners each May.

About 30,000 income tax assessment forms are printed by the computer and sent out annually between June and December for taxes due the following Jan. 1.

One of the unusual but profitable en-

(Continued on Page S/43)



One of the system's jobs is to help scorekeepers at the Isle of Man's two motorcycle races each year.

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- "Go To" command allows jumping to random file locations for repeat and linking applications.
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Matrix Suggests On-Line System Safeguards

(Continued from Page S/36

trieval routines (audit trail).

30. For distributed intelligence systems, consider downline loading programs to the remote stations such as concentrators, intelligent terminals and the like. In this way, a program can be changed at various times of the day and especially after maintenance has been performed to downline equipment.

31. Consider taking check-sum counts at various times during the day to ensure that the downline programs have not been modified.

32. Journalize all system commands entered through the system control console so they can be reviewed at a later date. Consider putting these onto microfiche.

33. Stringently control circuit test equipment. This specifically covers network monitoring equipment with which to read the data going over the communications lines.

It is even more important to stringently control the programmable network monitoring equipment. This equipment is necessary although the personnel authorized to use it should be limited.

The uses to which it should be put should clearly be stated, and it should be locked up in some fashion when it is not in use (this locking up might involve removing it from the area, installing a keylock switch in place of the on/off switch or covering it with a lockable metal hood so it is unusable).

34. Review the software controls at remote intelligent devices with regard to protection against unauthorized access, message accountability and procedures for the control of software changes as well as data base administration (especially with distributed systems).

35. Review the various modes of restart for distributed intelligence. This may range from a cold start to a fully automated recovery.

36. Review hardware controls on distributed systems such as software memory protection, disk file protection, read after write, hardware types of memory protection, time-sharing operations, software control procedures, dial-up modems and the like.

37. Review the operator manuals to ensure that they are thorough and up to date.

38. Review the software documentation with regard to distributed systems (especially distributed intelligence).

39. Review contingency planning at remote distributed system sites for total disaster, bomb threat, fire, partial disaster and the like.

40. Review the disposal of "sensitive" documents at remote terminal sites.

41. Review the training plan for the operations personnel with regard to the remote terminal sites and distributed systems.

42. Ensure that user handbooks, operations manuals and software documentation are marked as personal and private confidential information belonging to the specific organization involved. Also, ensure that they specify how to dispose of unneeded copies.

43. Ensure that adequate operator training is provided and that there are operator manuals which are updated periodically.

44. Try to ensure that there is a simple dialog between the operator and the application system. A simple dialog with a straightforward keyboard usually results in fewer errors upon input.

45. Preprogram instructions on how to use the system into the system and have them available for recall whenever an operator needs them (this will reduce the number of human errors on input).

46. Ensure that there are restart procedures and checkpoints for terminal operators to use during a complicated input transaction.

47. Design the system with format aids such as preselected formats to work the operator through the system in an orderly manner, or preprinted forms or menu selection format techniques and the like. This will result in fewer operator errors.

48. Provide an adequate work area for operators with regard to light, noise and temperature.

To reduce operator boredom, try to ensure a reasonably fast response time (two to four seconds); use graphics, color, flashing elements, various character size, broken lines and any other methods that will reduce errors upon input.

49. Consider using distributed intelligence to edit and verify the data prior to transmission to the central site or distributed system itself.

50. Consider computer-aided instruction in order to reduce the number of operator errors and as a method of training new operators.

51. Forbid master commands to be entered from a remote terminal. Master commands are those that change basic system parameters or affect operational programs or data bases. These should only be allowed from the central master console.

52. Periodically review the assignment and priority levels of passwords, terminal priorities, terminal identification circuits, circuit identifications and the like.

53. Perform editing and validating routines at the distributed intelligence or remote terminal points.

54. Immediately return erroneous data to the terminal operators so they can correct it on-line.

55. Develop listings for erroneous

(Continued on Page S/42)

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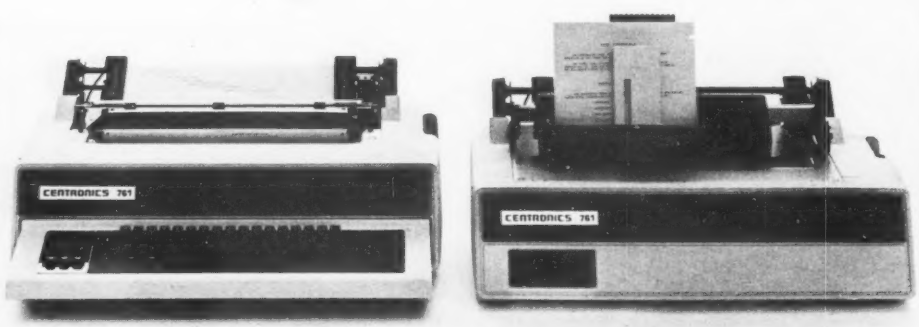

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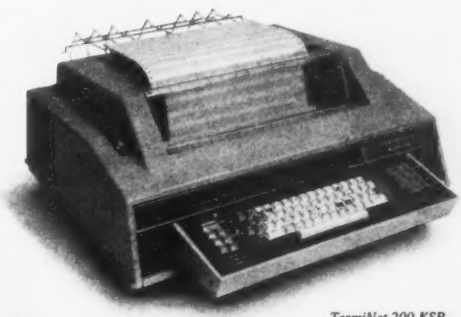

TermiNet 200 KSR

GENERAL ELECTRIC

CONCERNS / EXPOSURES

RESOURCES / ASSETS	ERRORS AND OMISSIONS	DISASTERS AND DISRUPTIONS	PRIVACY	SECURITY/ THEFT	HUMAN ERROR PREVENTION	MESSAGE LOSS OR CHANGE	ILLEGAL PENE-TRATION	TERMINAL DATA ENTRY AND VALIDATION	TRANS-ACTION ENTRY ERROR HANDLING	
TERMINALS	20,21,37,41,44 48-50,53-56, 63	3, 8, 24, 30, 36, 39, 58, 59	1,4,6-11,13,15, 17, 19, 22, 34, 40, 51, 52, 60, 68	1,4,6-11,13,15, 17, 19, 22, 34, 40, 51, 52, 60, 61, 68	37, 41, 43, 48-50, 53-56, 63, 64-67	19-22, 27-29,	4,6-11,13,15, 17, 19, 22, 24, 30, 34, 40, 51, 52, 60, 68	1,37,41,44,47, 49, 53, 54, 56, 60, 63	55-57, 61, 63,	
DISTRIBUTED INTELLIGENCE	20,21,37,41, 43-50,53-56, 63	3, 24, 30, 32, 33, 35, 38, 39, 58, 59	4-8,8-19,22, 23,25,28,30-34, 40,51,52,60,62, 68	4-8,8-19,22,23, 25,28,30-34,40, 51,52,60,61,68	37,38,43,45-50, 53-56,63-66	19-22, 25-29, 32-34	4-8, 8-19, 22-26, 30-34, 40, 51, 52, 60, 62, 68	1, 41, 47, 49, 53, 54, 56, 60, 62, 63	53, 55-57, 63	
PEOPLE	43-50, 53-56, 63, 66	2, 24, 33	2, 4, 6-16, 18, 23, 25, 28, 33, 34, 40, 42, 43, 51, 52, 60, 62	2, 4, 6-16, 18, 23, 25, 28, 31, 33, 34, 40, 42, 43, 51, 52, 60-62	25, 43-50, 53-56, 63-67	25, 26, 28, 29	2, 4-16, 18, 23, 25,28,30,31-34, 40, 42, 51, 52, 60, 62	1, 25-29, 37, 43, 44, 47, 49, 53, 54, 56, 60, 63-65	55-57, 61, 63	
CENTRAL SYSTEM	37, 44-48, 50, 55, 56, 63	3,24,30,32,33, 35, 38, 39	4-8, 8-18,22, 23, 25, 28, 30-34, 40, 51, 52, 60, 62, 68	4-8, 8-18, 22, 23,25,28,30-34, 40,51,52,60,61, 62, 68	37, 38, 43, 45-48, 50, 55, 56, 63-66	19, 21, 25-29, 32-34, 36	4-8,8-18,22-26, 30-34,36,40,51, 52, 60, 62, 68	1, 37, 47, 54, 56, 60, 62, 63	55-57, 63	

ON-LINE TERMINAL/DISTRIBUTED SYSTEMS CONTROL MATRIX

On-Line Terminal Matrix Suggests Controls for On-Line Systems

(Continued from Page S/40)

data and use these to ensure that the entries have been corrected and reentered into the system. Consider making this an on-line file that operates in real-time.

56. When reentering data (corrected data), ensure that the corrected data editing is done by using the same rules and/or programs as for processing the original transaction. It is best to resubmit the entire transaction.

57. Have control totals produced for all rejects. These to-

(Continued on Page S/44)

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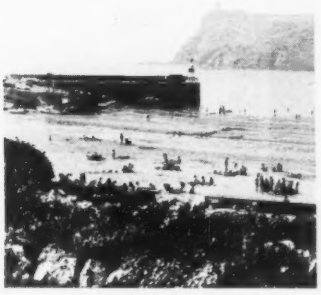
Isle of Man Breaks With Longstanding System

(Continued from Page S/39)

terprises run by the Manx Government is the Philatelic Bureau. The Isle of Man issues its own postage stamps including several commemorative issues each year. These issues are valued by collectors throughout the world, and they deposit funds with the Post Office to pay for the cost of new stamp issues mailed to them.

The 90/30 keeps track of some 30,000 account holders involved in



Typical Harbor Scene

this operation. Two Uniscope 200 terminals at the Philatelic Bureau and online to the 90/30 will shortly be succeeded by UTS 400 intelligent terminals.

Yet another unique operation in local government computer applications is scorekeeping at the two big motorcycle racing events held on the island each year. Sponsored by the Manx government and a major attraction for visitors are the Tourist Trophy races and the Grand Prix.

Input data is fed into Uniscope 200 terminals, provided on a loan basis by Univac, at the track site and transmitted to the 90/30 for processing. Timekeepers enter the motor cyclists' times into the terminals. Using a program built around Univac's Information Management System 90 (IMS 90), the system automatically adjusts all positions displayed on the terminal screen as a leader board of the first 15 riders.

Another CRT is used by the commentator for the Manx Radio Service and a third is placed in the press box for the convenience of sports reporters.

Thus far, the system has been a big help to scorekeeping. Because the riders do not start together but at intervals of about 10 seconds, it is difficult for spectators to distinguish first and last. However, the 90/30 keeps up with the fast-changing order and provides instant race statistics.

Services to Localities

Among other current applications, the 90/30 is used to provide some DP services for local authorities on the island, including some property tax collections, and a billing system for Ramsey, the second largest town on the island.

From time-to-time, the Manx government issues debenture bonds. The computer keeps records of interest payments and prepares interest checks to bond holders on a half-yearly basis, according to manager of DP for the Treasury, Maurice Maudsley.

Turning to future applications, Maudsley said these would include billing for electricity, amounting to about 15,000 quarterly bills, which would start in the summer of 1979. Another application due to begin soon will be keeping inventory control of all the stores kept by the various Boards. Also planned is the preparation of voters' lists.

"We also have a plan, as part of our medical services, to keep computerized records of schoolchildren's immunizations and vaccinations so the health authorities will have more accurate data," Maudsley noted.

Several other applications are scheduled, the most prominent being a companies index listing the 10,000 firms registered on the island, records of loans granted by the government for housing mortgages, records of television and radio license renewals and vehicle and drivers' license records.

Another anticipated chore will be customs and excise applications. This will come about when the Manx government takes over its own customs collection functions from the UK government in the near future.

Pleased With Operation

Maudsley noted that the operating experience with the 90/30 system has been very good.

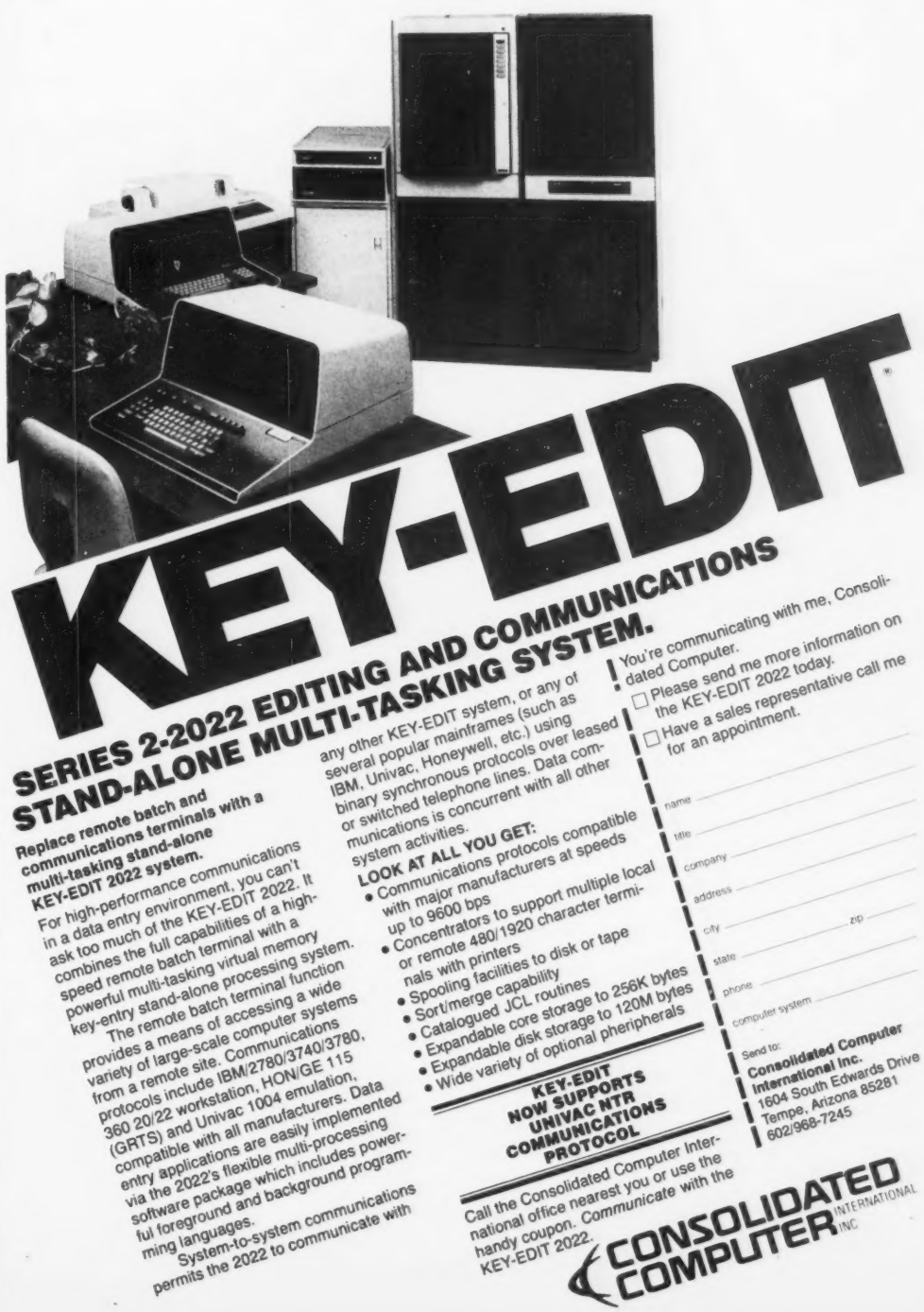
"In particular, we have found DMS 90 to be an excellent program that has been extremely successful for such applications as the property data base. We intend to use DMS 90 for a population data base, which we expect to complete around 1982.

"In addition, IMS 90 has been a good package and the OS/3 operating system has been fairly easy for our operators to use," he said.

The continued growth of new applications each year has led the Treasury to make preparations to keep its computer power abreast of the island's expanding needs, bearing in mind that the 90/30's capacity will be saturated within the next few years.

As a result, an order has been placed for the larger 90/60, with 1M byte of main storage capacity, which is scheduled for delivery in 1980. Additional UTS 400s are also on order for placement with the Electricity Board, Water and Gas Billing Office and Tax Assessor's Office.

With this system, Maudsley feels the Treasury will have the capacity to take on the applications planned.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Matrix Suggested as Guide to On-Line Control

(Continued from Page S/42)
tals should reflect new rejects as well as the elimination of accepted data.

Reconciliation of these control totals may be accomplished through manual monitoring of the data resubmission or through the use of a computer control program using suspense file principles.

58. Consider backup hardware for remote terminal sites (this depends upon the criticality of the business operation).

59. Review the preventive maintenance for the hardware at distributed sites (this should be both available and quick).

60. Where appropriate and necessary, make sure the user verifies authorization of inputs, either through the use of a signature on a source document, a user password or some other method.

61. Where feasible, segregate the functions of the generation of the transaction, the input of the transaction (on-line terminal input) and the custody of the assets. This may not be practical in an on-line system that has no source documents.

62. When logging input transactions, include the terminal identification and user password for audit trail purposes.

63. Even though this is a review of an on-line system, consider using variable size batches when large quantities of similar data are being input into the system. These batches would be internally accumulated and cross-checked with the batch numbers that are input by the terminal operator.

64. Try to include both business date and processing date as a field in a transaction.

65. Consider using the Julian date as a part of the transaction number.

66. Publish processing cycles to allow users to control their cutoff dates. Have the computerized system check for cutoff dates to ensure timely entry of transactions.

67. Instruct terminal operators to use scanning techniques or sight verification prior to transmitting messages.

68. Use a unique terminal identification chip. This is a circuit chip built into the terminal so whenever the terminal is logged in, the central site or distributed intelligence interrogates the terminal to get its identification.

In this way, the organization can control which terminals will be allowed to interconnect with the central or distributed system.

This article was extracted from Internal Controls for Computerized Systems, *by Jerry Fitzgerald of Jerry Fitzgerald and Associates, 506 Barkentine Lane, Redwood City, Calif. 94065, by permission of the author.*

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Puts Operations On-Line

System Unites Scattered Stores

ALLENTOWN, Pa. — Faced with expanding business responsibilities and the burden of operating 15 stores scattered throughout central Pennsylvania and Maryland, a department store chain headquartered here added an on-line computer system to its DP operations to keep its head above retail waters.

Although Hess's, Inc. has installed five NCR Corp. Criterion computer systems since 1970 — handling payroll, inventory and purchase orders — the department store decided to go another route when administrative burdens increased. The company injected a communications capability into its DP systems with an automated purchase order management software system from NCR that linked the computers located in various regional centers.

"It is easier for us to modify software packages than it is to start from the beginning," Vice-President and Director of Management Information Systems Richard Kula said. "So, when NCR offered us the opportunity to work with them on the purchase order management system, I was quick to agree.

"I knew we needed it. In fact, we had been talking about doing something like it for three years."

Depended on Control Books

Hess's buyers had been working with a manual system and depended on their unit control books to keep track of order and inventory information. However, these were only as accurate and up-to-date as the persons posting them.

Once a month, each buyer went to the receiving and marking center to take an inventory of the orders and goods on hand. Each checked his files against those at the receiving center, calculating how much merchandise was received against each order and how much inventory actually existed and was budgeted for the coming months. Although it was a frustrating and time-consuming procedure, it was a necessary one.

Another problem with the manual system lay in the preparation of the original purchase order. Orders were handwritten by the 100 buyers and their assistants, and extensions were calculated by the writers. As a result, there were 100-plus styles of penmanship and 100-plus degrees of accuracy in pricing.

Errors were bound to occur, and they did, Kula recalled.

Orders were also sometimes confusing to vendors. The problem was compounded at the receiving center, where copies of the handwritten documents were kept for confirmation that goods were delivered. So many copies were illegible that errors were common.

System Cuts Confusion

With 640K bytes of memory running with five partitions under a B-3 operating system, the NCR Criterion setup eliminated most of the confusion, Kula said. The buyers and their assistants still rough out orders on worksheets, but after the data is entered through NCR 796-501 data terminals, the NCR Criterion 8570 DP system takes over.

The computer monitors purchasing budgets. Checking against the open-to-buy budget, it notifies the data entry operator if the buyer is over budget. If so, authorization is required for the order to go through. If the buyer is within budget, the extension is automatically calculated from the merchandise price, and the purchase order is printed and sent to the vendor, Kula stated.

The receiving center can access data in two ways. Paper copy is automatically printed out at the center as data is entered. It is used as backup in case the line goes down between the computer and the center.

The other access route is through on-line NCR 796-501 CRT terminals in the warehouse.

When goods are delivered, the system makes it easy to locate the original order data. For example, if an order arrives without a purchase order number, the receiving people simply key the name of the vendor through the CRT terminal. Every purchase order outstanding to that vendor is displayed.

To help narrow the search, part of the purchase order number identifies the department for which the goods are destined. By matching the goods with their departments, the operator can quickly pinpoint the order.

After the goods are staged, marked and shipped to the proper stores, that information is entered through a remote terminal at the receiving center.

Current inventory information is on-

(Continued on Page S/46)

Computer prints out purchase order electronically. A copy of the purchase order is also printed out remotely at the Receiving and Marketing Center, where it serves as backup document if communications lines go down.

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1979 'A'

Local Points of Interest Available

Marriott Net Offers More Than Reservations

WASHINGTON, D.C. — Have you ever wondered what happens when you dial one of those toll-free numbers to make a hotel reservation?

If you were to call the Marriott Corp.'s 800 number, you'd be connected to a reservations agent in Omaha, Neb., who has immediate access to the computer-stored equivalent of a 650-page hotel and travel directory.

At the Marriott reservation center, some 125 agents use CRT terminals to provide up-to-date information on room availability for any one of Marriott's 55 owned, managed or franchised properties in the U.S., Mexico, Middle East, Europe and the Caribbean.

Agents also use the IBM 3277 terminals to book reservations and answer questions about Marriott properties.

"That's an important feature of our system," according to Suzanne B. Rasmusson, systems account manager in the Hotels Division. "Not only can agents book rooms, but they also get answers from the computer to questions about hotel rates and services, local points of interest, a calendar of current events and just about everything that helps provide better service to customers."

Twelve "screens," or pages of information, on each of Marriott's properties are available to agents.

Work on the computerized reservation system started about three years ago, when the growth of the Marriott hotel chain began to outdistance the capabilities of the manual system then in use.

"We had a 40-foot long status board on which we placed magnetic characters and numbers," Rasmusson recalled. "The system was adequate for the number of properties back then, but it would have been impossible to handle the number of incoming calls and reservations today."

Using the new system, agents have handled about 9,000 calls and made more than 3,000 reservations on peak days.

The key to the Marriott reservation system is distributed data processing (DDP). The host computer — an IBM 370/158 in Marriott's suburban Washington headquarters — is free to do administrative tasks, while the actual handling of reservation information is done by three small control units in the Omaha center.

Backup System

"We designed the system so that each major unit — the host computer and the three IBM 3791 controllers — can back each other up in case one should be out of service," said Rasmusson. "Since duplicate files are kept in four different locations, information is always available to the agents for customer use."

The host computer is used primarily to service the management information requirements of the Marriott Corporation. These include the preparation of payrolls and management reports, food and beverage inventories, customer surveys and market research.

"We're now able to determine booking trends and can evaluate where the reservations are coming from," Rasmusson said. "We can track turndowns, seeing if rates are too high, or if the property is too far from a customer's business destination."

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System Unites Scattered Stores

(Continued from Page S/45)

line to buyers. Because there is a lot of information, it is only reported on an exception basis, Kula said. Buyers receive exception reports weekly; they can also trigger reports whenever they need them, however.

Periodically, complete stock status reports are printed out for the buyers. These list everything in inventory along with complete budget status information.

Data entry is done either at the receiving center or in the computer department. The system can also close the loop on inventory control by incorporating on-line reporting from the point of sale.

Three hundred and fifty on-line, interactive NCR 2151 terminals have been installed in six of Hess's stores. Plans call for them to be equipped with OCR-A-type wands for automatically reading merchandise tickets. Transaction data then will be transmitted to the computer, where it will be used to update inventory on a real-time basis.

"The purchase order system is the nucleus of our future systems development," Kula stated. "We will put full emphasis on merchandising systems during the next few years. This will allow us to provide merchants with the information they need to do their jobs better."

In the spring, the computer will be upgraded and software installed to convert it to virtual memory. Then partitions will no longer be needed. The computer will schedule itself.

The upward compatibility of the NCR computers is important, Kula commented. Each time the equipment was upgraded, existing programming was transferred to the new system without change.

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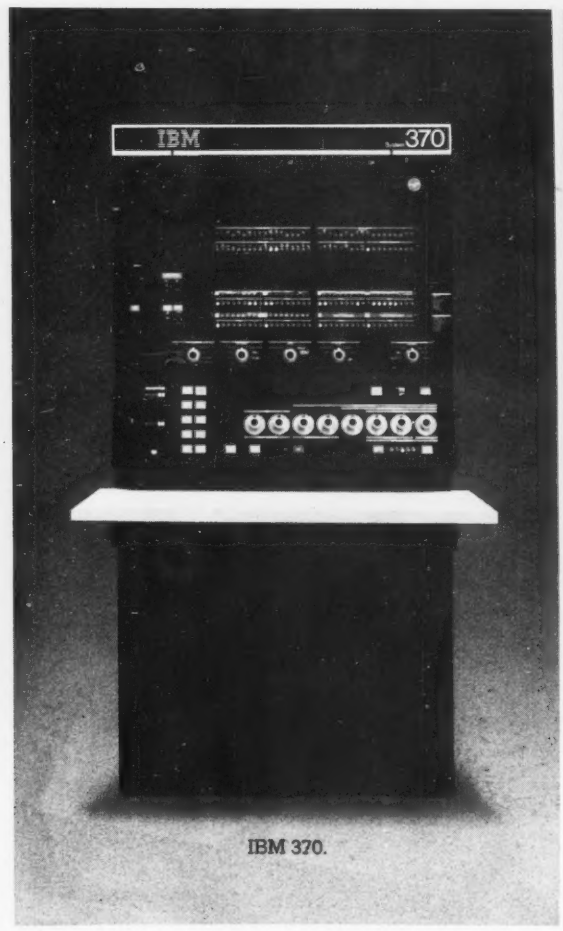

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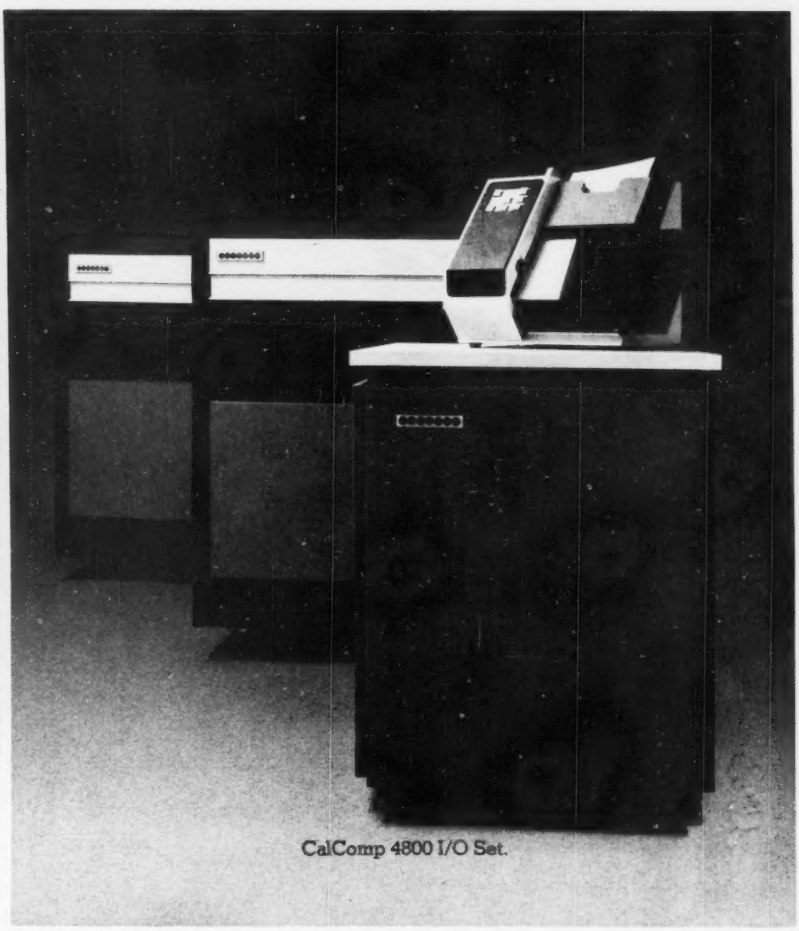

CalComp 4800 I/O Set.

Conversions: How to Overcome Resistance

By Charles L. Smith
Special to CW

MIDDLETOWN, Ohio — One of the big problems DP managers face in making significant hardware changes often goes unnoticed. That problem is getting employees to respond positively to a change.

Some time ago, a planned conversion from keypunch equipment to key entry hardware gave us a chance to apply Paul R. Lawrence's ideas for overcoming resistance to change. The ideas were presented in a 1969 article in the *Harvard Business Review*. The project, conceived as an experiment that could be canceled at any time, worked out well for us in terms of convenience, human factors and cost savings.

A self-fulfilling prophecy, common in many installations (and elsewhere), says operators of keypunches, data entry systems and computers can only be operators. Since they are treated in this fashion, they tend to do only what is expected of them; they act as if they can only be operators.

This prophecy prevents DP managers from making the best use of both their human and hardware resources.

The first step outlined by Lawrence is "participation." We decided to involve the operators in the equipment selection, planning, programming, control and implementation.

First, we selected two operators to head the effort. These were the chief key entry operator and her backup. After we whittled down to three the list of possible vendors, the operators and I visited sites that had installed the vendors' hardware.

(Continued on Page 72)

With Processors, Scanning Techniques

Caltech Scientists 'Snap' Uranus Rings

By Ann Dooley
CW Staff

PASADENA, Calif. — The recent and dramatic photographs of the planet Jupiter have tended to upstage important findings about another planet, Uranus. And computer technology played a major role in producing the first picture of the recently discovered rings around that planet.

Aided by computers and complex scanning methods, California Institute of Technology (Caltech) astronomers determined that the rings of Uranus probably contain a stony composition, unlike the rings of Saturn, which hold ice.

The faintness of the rings creates severe problems for anyone attempting to photograph them. To obtain the picture, Caltech scientists entered data from numerous scans of the planet into a computer, where it was ultimately converted into a television-type picture of the rings and then photographed.

The three scientists participating in the project used Hale Observatories' 200-in. telescope at Palomar Observatory in San Diego to perform the scans for the picture. The three performed the raster scans — similar to those on a TV screen — across Uranus and its rings, recording reflected sunlight at two infrared wavelengths, 2.2 microns and 1.6 microns.

At a wavelength of 2.2 microns, the planet proved to be almost completely dark because of the methane on its surface, which absorbed most of the sunlight at that wavelength. Some sunlight from the rings was reflected at that level, however.

The planet appeared very bright contrasted with the rings at the 1.6 micron level.

To get a true picture, the scientists subtracted the 1.6 micron scans from the 2.2 micron scans, in effect subtracting the "image" of the planet from the data, so that only the representation of the rings remained. The data was then plotted and keypunched onto cards, which were entered into the University's IBM 370/158 system.

The system arranged the data into a matrix, which was transferred to magnetic tape and then input into a Digital Equipment Corp. PDP-11/03 minicomputer. Next the information was displayed on a CRT and photographed.

The resulting picture confirmed that the rings are complete without extraneous material. The picture also confirmed that one of the rings around Uranus, the seventh plant from the sun, has a very distinct form and movement, which one of the scientists likened to the motion of a hula hoop.

Taken at a distance of 1.6 billion miles from earth, the picture does not show the distinct outlines of the individual rings, but only a single, wide band whose width is a measurement of the brightness of the reflected light. The rings are much narrower than they appear.

The studies of light emanating from the rings showed no evidence of either water ice or ammonia ice in the rings. The pictoral evidence differed from the widely held theory on the formation of the satellites of the outer planets, which contends that the rings contain ices, like the rings of Saturn.

(Continued on Page 66)

Must Balance Two Goals

DP Department at GM on Tightrope

By Jay Woodruff
CW Staff

DETROIT — For the computer science department at General Motors Corp. (GM) Research Laboratories, providing DP for research and design is like walking a tightrope.

"On the one hand, we have a goal to provide advanced capabilities. On the other, we need to provide stability. We try to be as innovative as we can, but we've got to keep everything up and running when we're needed," department head Don Hart explained.

GM has been using computers for automobile design since the early 1960s. The research division, half of whose 1,600 employees are research engineers and scientists, uses the computer science department for design, safety analysis, mechanical test analysis and variety of other functions required by the divisions of the company, Hart said.

The department is divided into two parts. One provides scientific and engineering services while the other searches out "better ways to do the things we do and ways to use computers," he remarked.

Divisions Individually Equipped

Each GM division has its own computing facilities, so many of its computing needs can be cared for in-house. The computer science center is used for more complex work, involving the resources of the largely IBM-based operation.

"We sell computer time to other operating divisions of the corporation, such as Chevrolet, which come to us for capabilities and computing facilities that are not worth installing in its own divisions," Hart said.

The computer science department provides the resources of a computing workshop, including software support and an elaborate statistical analysis program. Simulations and training on the center's terminals that are hardwired into the system or connected by telephone lines are also offered.

Researchers use two operating systems on the facility's IBM systems — MVS for general engineering and scientific work and Time-Sharing System (TSS) for computer-aided design on graphics consoles. The MVS CPU complement includes a

(Continued on Page 69)

Utility Slims Operations Without Extra Workers As It Moves COM In-House

Special to CW

VANCOUVER, B.C. — Is it possible for a large public utility to reduce paperwork, cut costs and streamline operations without increasing personnel and limiting services?

Executives at British Columbia Hydro and Power Authority (B.C. Hydro) thought so and, after studying their company's methods of information management, embarked on a computer output microfilm (COM) system that not only decreased paperwork and costs, but also put smiles on the faces of many customers. With results like that, management is smiling, too.

B.C. Hydro not only provides dual utilities — electricity and gas — to the public, but also operates passenger and rail freight transport systems. As the third largest utility in Canada with revenues of more than $3 million per working day, the company was challenged by many routine tasks, including processing 25,000 customer bills a day, answering thousands of telephone and in-person inquiries and maintaining accurate records for its nearly one million customers.

The paperwork was becoming unmanageable, and the company realized there had to be a better way. Since B.C.Hydro's service functions are decentralized, records must be available to many

(Continued on Page 72)

Xerox 9700 Enhanced

EL SEGUNDO, Calif. — Users of the Xerox Corp. 9700 electronic printing system will be able to improve its efficiency with two recently announced magnetic tape units, a spokesman claimed.

The drives allow users to use 6,250 bit/in. tapes, as well as the more commonly used 1,600 bit/in tapes, he said. The denser format reportedly provides better error correction capabilities, in addition to the change in data rate and reduced tape handling.

The dual-density version, which will be available this month, sells for $55,000 or rents for $1,200/mo. The single-density version, scheduled for July delivery, sells for $35,000 or $1,050/mo. Xerox can be reached at 701 S. Aviation Blvd., El Segundo, Calif. 90245.

Family of Shredders Introduced

WESTBORO, Mass. — A family of shredders introduced recently by Security Engineered Machinery Corp. can reportedly shred microfilm, microfiche, unburst computer output and other papers at rates ranging from 50 lb/-hour to 1 ton/hour.

Smallest Unit

The smallest unit in the series, the Model 700, is the size of a file cabinet and acoustically treated, a spokesman said. All units have a built-in vacuum system that automatically collects and compacts material after it is destroyed, simplifying disposal and eliminating fire hazards.

In addition, all models have been approved by the Department of Defense for the destruction of classified materials.

The units cost $2,000 to $12,000, depending on the options chosen, a spokesman said from 5 Walkup Drive, Westboro, Mass. 01581.

Uranus Rings 'Snapped'

(Continued from Page 65)

But the rings of Uranus appeared to be comprised of very dark, stony material. This may indicate that they were formed after the planet or that the ring material was subject to high temperatures at the time of formation, which would have evaporated any water or ammonia, according to the scientists.

The research project was conducted by Keith Matthews, a staff physicist, Gerry Neugebauer, a professor of physics, and Philip Nicholson, a planetary science graduate student at Caltech, with grants from the National Science Foundation and the National Aeronautics and Space Administration.

Discovery Circumstances

The rings around Uranus were discovered on May 10, 1977 by several independent groups of astronomers. The discovery of the faint rings occurred when the light from a distant star passing behind Uranus was found to blink as it passed behind the rings.

Five main rings were found then, with radii ranging from 44,800 - to 51,800 kilometers and widths from 3- to 100 kilometers. Three more rings were discovered a year later by Caltech scientists using infrared techniques.

The Caltech research team plans to do more infrared experimentation on the planet and try to obtain another picture of it to determine how the rings change and move over time.

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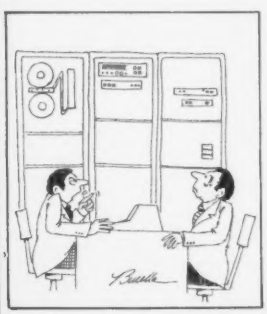

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Cigar Maker Keeps Business Up to Snuff With System

By Connie Winkler
CW Staff

NEW YORK — What this country once needed was a good 5-cent cigar. Today, what a cigar manufacturer needs is a good computer system.

Consolidated Cigar Co., headquartered here, believes it has that system. The company uses its mainframe for applications ranging from business planning to determining the kind of tobaccos to put in its cigars. That is a particularly important application because tobacco characteristics vary from region to region and even from season to season within one region.

Business planning is also crucial to a cigar company because the cigar industry is being snuffed out at a rate of 3% to 5% of volume each year, according to William S. Gemmel, senior vice-president of the Consumer Products Group of Gulf & Western Corp., of which Consolidated Cigar is part. However, Consolidated Cigar's market share has continued to increase each year, and domestic sales are now about $330 million, Gemmel said.

Young and Old Gear

In the near future, the company wants to put marketing and financial planning departments on its Burroughs Corp. B6700 — the work is now being done off-line on two Anderson-Jacobson, Inc. terminals. Although Consolidated Cigar does some personnel work for its sister company, the Schrafft Candy Co., most of its applications are now on stand-alone IBM System/32 and IBM 5100 minicomputers.

The plan is to bring Schrafft in Boston on-line with a B1800 mainframe there connected to the B6700 in New York.

Consolidated Cigar's DP shop, which dates back to an IBM 1620, is a combination of old and new equipment — everything from an IBM 1001 to the Burroughs B6700 system. The system includes the CPU with 1M byte of memory and a head-per-track disk drive.

George Rey, manager of systems and DP, particularly likes the reliability of that head-per-track machine since the disk is not removable from the machine.

The order entry system presently being developed by the company will allow operators to enter orders on a CRT as they are received, with the system taking over all order functions, including credit checking. This system, which Rey hopes to have running by June, will replace the current batch-entry system.

One unusual aspect of DP operations at the company is the method it uses to transmit production data from its plants in Pennsylvania to headquarters — the IBM 1001 links a card reader in those locations to a card punch in New York. The long-term plan is to link the Pennsylvania plants and one in Puerto Rico with headquarters.

The IBM 1001 is a 20-year-old piece of equipment that Rey guessed "isn't even mentioned by IBM today." However, he is highly satisfied with the unit — and its price. "At $16 a month, it's hard for me to rationalize getting rid of it to my management," he said.

The company has progressed from an IBM 1460 to a Burroughs B5500 in 1967 to its present system. At the time the company made its latest switch, Burroughs offered such advanced features as dynamic memory allocation, virtual storage allocation of memory and sort statements in Cobol, Rey said.

In addition, it appeared to give the company the best price/performance ratio. But even with these features, "it was very risky leaving IBM at that time," he recalled.

However, that price/performance ratio held up again when the company considered an IBM 370/148. Aided by the promise of an easy transition from the B5500 to the B6700, however, the company chose Burroughs over IBM.

CW Photo by C. Winkler

George Rey (standing) likes the "clean console" of Consolidated Cigar's system because, he said, operators like Leighton Smith shouldn't have to worry about all the blinking lights, which are for engineers.

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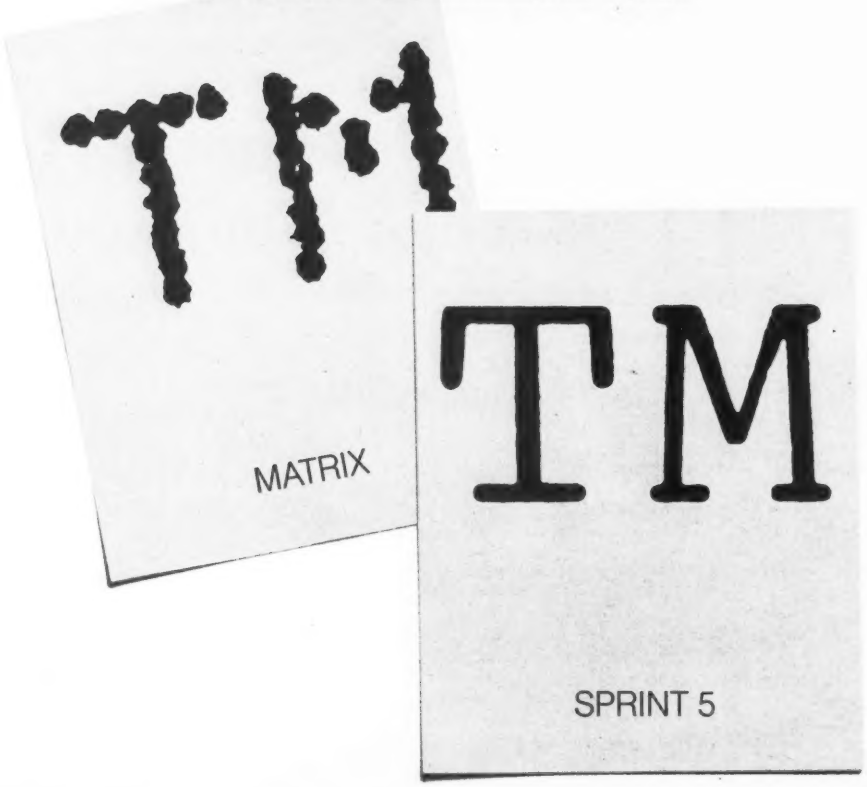

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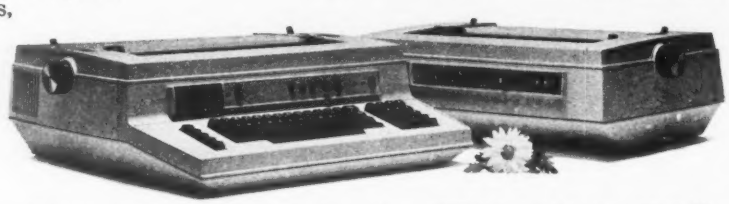

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Big Systems, Smaller Staffs?

People Called Data Center's Vital Peripheral

By Howard A. Karten
CW Staff

SAN DIEGO — Look around your data center. What's the most important peripheral you see?

Unless you said "people," you're wrong, according to James Garrett of Value Computing, Inc. Not only are people an element of data centers often overlooked, there is a corresponding tendency to reduce the size of the data center staff as systems become bigger and more powerful, he told a recent USE, Inc. session devoted to performance measurement and evaluation.

Data developed by Garrett's company indicated the average turnaround time for a job in a typical installation is 14.8 hours. But only 7% of this time is computer-related, he noted. Output preparation and the ancillary services necessary for output preparation, such as bursting, decollating and distributing information, consume 73% of the time.

Garrett illustrated his point with an anecdote from his company's experience. A large, multi-CPU insurance company client sought to improve its operation and reduce its bottlenecks, he recalled.

"The best trade-off for it was to acquire two bursters and some temporary people at night to run them," he said. The company's return on investment for the bursters and personnel was worth more to the company than an additional CPU.

On a broader level, the problems typically encountered by data center managers derive from a certain shortsightedness, he observed. Four "well-established processes" that exist in manufacturing operations are routing, scheduling, dispatching and follow-up, he stated. However, he has found some manufacturing operations that successfully apply these elements to their operations, yet fail to apply them to data center operations.

"Data centers will allow people to run in and throw jobs in the middle of their production line and never think a thing about it, and yet if you walked into the factory, you would not in any way be allowed to do that," he remarked.

One key to successful, efficient data center operation is a computerized scheduling technique, using a data base with relevant information, Garrett said.

Part of the reason for the lack of widespread use of such systems may be that data center managers sometimes can't see the forest for the trees, Garrett commented.

"We tend to be so taken up with the day-to-day problems we have, responding to users and answering questions about where jobs are, that we don't use systems like this to reach out into the future and give us display information" that is highly useful for improving operations, he said.

Division Balancing on Tightrope

(Continued from Page 65)

370/168 attached processer and a 3033.

Presently, 62 IBM 2250 and 3250 consoles are on-line to two 3033 CPUs, each with 8M bytes of IBM memory. The center also used Digital Equipment Corp. GT-62 consoles and Tektronix, Inc. graphics consoles.

'Cadance' for Graphics

Graphics design is carried out on a GM-designed system called Cadance. Typically, computer systems are not used for design until paper and scale models have been constructed and overall vehicle layout has been agreed upon. From then on, the systems are used heavily to aid in development.

"As the design begins to stabilize, a full-scale model is handmade. Once it is agreed that 'this is it,' the designers produce the computer equivalent from a pencil drawing of the model," Hart explained.

A mathematical model is made, based on those drawings, and it appears on screen in a vector graphics display of white lines on a dark background. Then the representation is worked on, much as a draftsman worked before computers were used, but "with much more elaborate and complicated tools, accomplishing more in each step," he said.

The display allows the designer to view the pictorial representation of the mathematical model from any angle. Once it has been worked into a form that is acceptable to the engineers and stylists responsible for its design, the information is sent to other locations, which are concerned with all the engineering work related to producing the sheet metal for the design.

Helps Safety Testing

Graphics terminals can be used to reduce the cost of safety testing, although experimentation cannot be replaced entirely, according to the center's director.

For example, to measure the structural integrity of a front fender, engineers and designers make extensive use of structural analysis using Nastran, a program developed by the National Aeronautics and Space Administration (Nasa) several years ago to support aerospace work.

"You develop a model of the fender and feed the data into the Nastran program, which tells how much it bends and at what frequency it will vibrate. The structure of the individual part can be added to a model of a large section of the car to see what the strength of the whole assembly is likely to be," Hart said.

Although experimental methods cannot be replaced entirely, mostly because "the models we make are only as good as the faith we have in their accuracy," computer modeling reduces the amount of required testing. "We don't know how to model everything, so we can't totally substitute analytical methods for experimental methods. The two go hand in hand," Hart noted.

Computers also help reduce the amount of time needed to bring a car from the drawing board to a finished work of metal, glass and plastic. Not only is design work completed more quickly, the computers improve the quality of the design by making it easier to figure, for example, the amount of aluminum needed to replace steel to produce a lighter, more fuel-efficient automobile.

Designers and engineers are brought together from the various divisions to form a special task force that works for a year or more in a concentrated effort to design a car, Hart said. This allows visual and engineering design to work together instead of passing their work back and forth between divisions, he added.

In addition to providing facilities for DP work, the computer science department researches ways to use computers with greater cost effectiveness. One approach has been to tie together the minicomputers used in testing car engines and other mechanical parts into a larger CPU for data acquisition and analysis.

In the case of an engine, the minicomputer that controls the test input and collects data from the test can be connected, along with others, to an IBM 370/148, soon to be replaced by an Itel Corp. AS/5. The CPU performs data analysis and feeds it back to an engineer at a terminal, where he can monitor the progress of the test. For extensive analysis, many minicomputers are tied through a local network to larger systems.

The department is becoming involved in the use of computers in the manufacturing process, an "explosive growth area," Hart said. "GM has a big interest in small minicomputers that will appear in our plants performing all sorts of tasks such as quality control data gathering and control of industrial processes."

"We want to improve as much as we can the productivity of the user community — engineers and scientists — so they can get more done, but provide these tools at a reasonable cost," Hart said.

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Drawings Modified via Mainframe

Technique Enhances Cartoon Makers' 'Antics'

STOCKHOLM, Sweden — The Swedish Broadcasting Corp. (SBC) here is using a computer to help it prepare animated films. The system, said to be unique, cuts down the repetitive, time- and labor-consuming task of preparing all the drawings for cartoons.

The system uses a Univac 1100/11 mainframe and a technique developed by Alan Kitching, a British animation and DP specialist. Known as Antics, the technique begins as a basic drawing is input into the system with a light pen.

Special command words, coded directions and speed and position information are fed into the system, which can modify the drawing in several ways. The image can be shrunk, enlarged, panned, skewed, shaken or reversed. Rotation, jumping and rocking motions can also be performed.

Forty Commands

There are presently 40 such commands available and Kitching, manager of Grove Park Studios in Camberwell, London, is working on more.

One of the newer concepts in the system is the *SKELETON* command. It can make part of a drawing, such as a human character, move from a beginning to an end position, using parameters supplied by the operator.

With this information, the system automatically can create any pictures between the initial one and the desired one. The movement of the figure appears as a smooth, natural motion.

When the entire sequence is created, it is presented on a CRT and then recorded on videotape for playback and corrections.

Sven Hjort, systems technology manager for SBC, is enthusiastic about the opportunities the system affords. "Animated film offers numerous advantages on TV in complicated situations that would be impossible to explain or fully illustrate. It is often necessary, but the problems with it have been high cost and time consumption.

"With this system, we can produce in a few weeks what would previously have taken more than six months to make," he said.

Other Capabilities

The Univac system is not limited to cartoons. It also runs a planning and booking system for basic resources (studios, studio personnel film teams and studio and workshop managers). CRTs attached to the system provide rapid access to daily information on resources.

"Booking and updating takes place in real-time, providing all those concerned — for example, program planners and producers — with information whenever they need it," Hjort noted. "Planning thus becomes more reliable and ensures more efficient resource use."

The system also keeps track of a record catalog with more than 600,000 records and millions of titles.

The system was supplied by Saab Univac, a Scandinavian organization of which Univac is a member.

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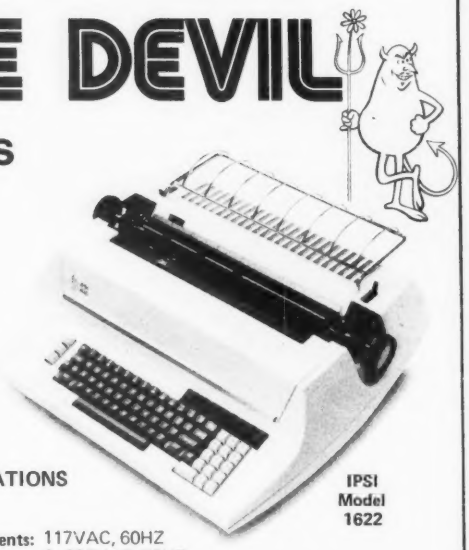

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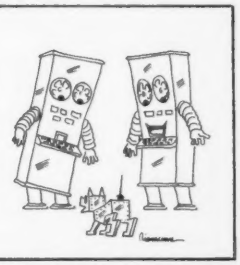

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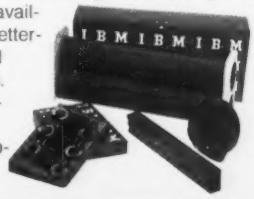

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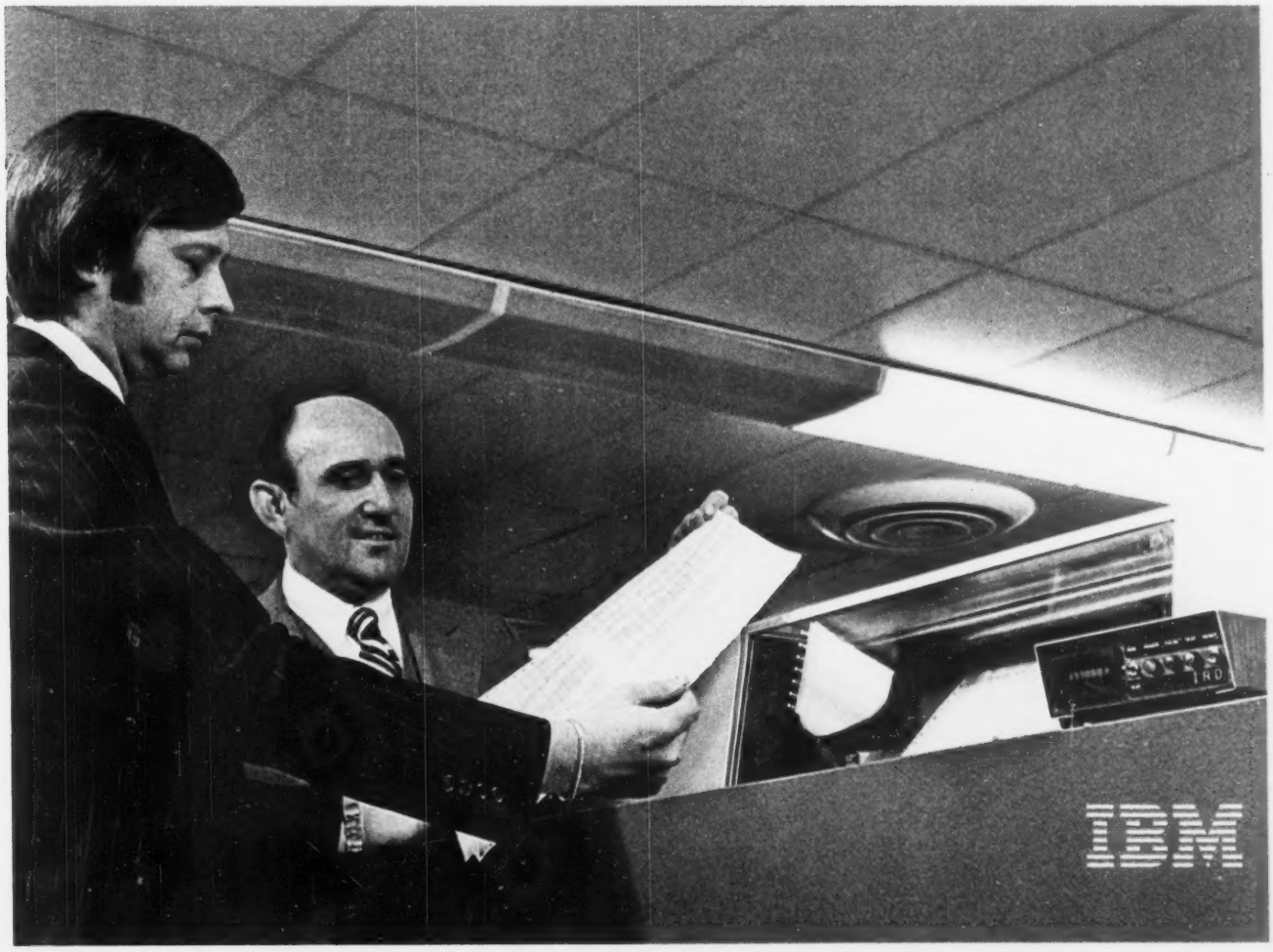

COM Moved In-House Without New Hires

(Continued from Page 65)

different people in different parts of the province.

The transition to COM thus became a necessity. The firm realized how much easier and less costly it would be to distribute 1,100 copies of 130 original microfiche to the company's 67 district offices than to deliver a stack of computer printouts more than four feet high, according to George Koochin, manager of office services.

Sought Service Bureau

When B.C. Hydro first embarked on the COM program, it sought out a micrographics service bureau. The bureau was responsible for processing tapes previously formatted on the company's own IBM 370 system.

The tapes contained records of transactions emanating from a number of departments, and those records were placed on microfilm. Once the bureau made the microfiche available to B.C. Hydro, it was distributed among various district offices and departments. All of the records were then accessible as needed.

Time previously spent searching through a sea of paper for one customer's outstanding balance or new address could instead be spent on more important tasks.

Employees welcomed the transition to COM. "The microfiche distributed throughout the district offices is their primary source for answering customer inquiries about the status of accounts. If the employees can answer the questions quickly, the customers are happier. This makes for better public relations, and presumably cash payments are forthcoming more readily," Dick Larson, customer accounts supervisor, pointed out.

One More Step Forward

After working with a service bureau for a number of years, the corporation was ready to move one more step forward. Costs for the manufacture of microfiche were climbing as the amount of microfiche increased, and the need for greater flexibility in the system became apparent. Management decided the company would implement an in-house COM program by purchasing its own equipment and training its own personnel.

M.I.C.R. Systems Ltd., Canadian distributors for Datagraphix, Inc., won the public bidding for its Autocom microfiche recorder system.

Was the decision to leave the safety and security of a service bureau a wise one? B.C. Hydro's management believes it was.

Costs have significantly decreased; in-house costs are less than one-third the service bureau's charges. Fewer personnel are required to operate the COM unit and, because the Autocom processes previously formatted tapes, one employee can easily handle the recording and duplicating of all microfilm (processing of film takes place automatically within the Autocom).

Another advantage is that it is easier to supervise the quality of work performed within the company, according to Fred Preuss, supervisor of micrographics and records.

Some Skepticism

There was some skepticism before the transition from a service bureau, however. Management feared that frequent machine breakdowns might be a problem, and Preuss himself worried about the quality of the service he might receive when a breakdown did occur.

However, those fears were unfounded, Preuss said. The COM unit at B.C. Hydro is fully operational more than 99% of the time, and service to date has been no problem. Preventive maintenance is performed regularly by M.I.C.R. Technicians, and the average response time to a service call is approximately two hours.

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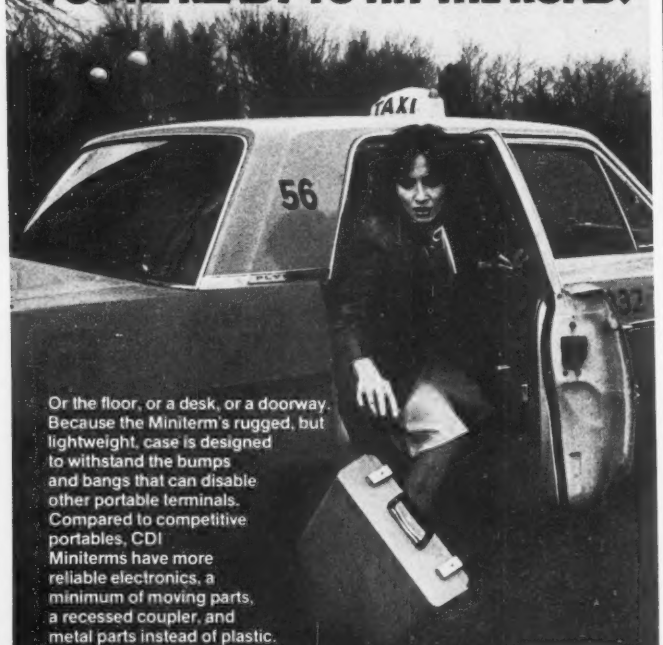

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How to Tackle Resistance

(Continued from Page 65)

They agreed with the choice that I thought best.

By involving these operators in the decision, we fulfilled the participation requirement. It also helped to reduce resistance to the change, another point Lawrence made.

Social Considerations

The true nature of resistance to change is usually based on social — not technological — considerations, Lawrence indicated. My next task was to get the others socially involved with the conversion.

I asked the head operator and her assistant to choose the two operators they thought had the greatest potential to become programmers on the key entry hardware. Naturally, I reserved the right to veto their choices, although this proved unnecessary.

This left six operators uninvolved. Out of these, I chose a temporary leader, making her responsible for assigning the remaining operators to other tasks, such as the selection of key entry tables, the room arrangement, training schedules, user coordination and so forth.

At this point, all the operators had roles to play in the conversion of the system, sharing responsibility and accountability. Lawrence stated that participation is more than the mechanical act of taking part in discussions, so we were proceeding in accordance with his theory.

Self-Fulfilling Prophecy

An important part of this project was winning the confidence and active participation of the programmers and programmer/analysts that had been assigned to work on the project.

These staff assistants behaved exactly the way human beings are expected to behave; they perpetuated the self-fulfilling prophecy. They seemed self-occupied and loved to use incomprehensible terms in front of the operators to impress them.

That is, until one important event occurred.

The event was a training program run by Four-Phase Systems, Inc., the vendor we had chosen. The program was attended by the staff assistants, four of the keypunch operators and myself.

Edge Goes to Operators

In the beginning, the programmers and the analyst clearly had the advantage. However, the know-how of the operators became apparent as we got further and further into our own applications.

With encouragement and coaching, the operators began turning out excellent programs for the hardware and were soon correcting and modifying the others' programs. In fact, sooner than anyone expected, the operators completely took over the programming phase and the staff assistants were dismissed to do other work.

They were not as valuable at that point as the data entry operators.

Happy Ending

Our actual, out-of-pocket savings amounted to $36,200/year as a result of this conversion. The original staff of 10 was reduced to eight, and the eight were producing 25% more work with the equipment. (Last year, productivity rose another 8%).

Although these are the kinds of savings generally expected from such a conversion, the biggest gains were the ones that followed.

The four operators that headed the project were all promoted, one to staff assistant in the personnel department, one to payroll administration, one to IBM 370/138 operator and one to head key entry operator. All four women realized their own hidden talents and worked toward self-actualization.

The results of the change, in terms of the overall benefit to the company, extended beyond increased productivity.

Smith is an operations manager with Armco, Inc. in Middletown, Ohio.

More Time for Applications

Minis Unveiled to Ease Function Worries

COLUMBIA, S.C. — An instruction set said to result in more time for applications programming and less worry about routine functions comes with two minicomputer series announced by International Systems Corp. (ISC).

Similar to IBM 360 and 370 formats, the instruction set of ISC's Antares 300 and 400 minicomputers provides both 16-bit and 32-bit formats. Sixteen general-purpose registers, up to 256K bytes of main memory with a 600 nsec cycle time, a standard multiplexer bus, a 6800/8080-compatible microprocessor I/O bus and polled or directly vectored interrupts are features of the systems.

The processor for the systems includes 64K bytes of directly addressable random-access memory (RAM) on its basic printed circuit board. For applications requiring program security, the processor optionally supports 48K bytes of read-only memory (ROM) with 16K bytes of RAM or a ROM/RAM mix of 8K and 56K bytes, respectively.

ISC's OS/16 MT2 multitasking operating system supports both Antares families in a real-time environment. This software allows the user to minimize memory requirements by using disk storage for functions that are not time-critical, the vendor stated.

The foreground of OS/16 MT2 supports user-written tasks with up to 256 priorities. Task scheduling occurs on a priority basis; each task is engaged by operator request, hardware interrupt or previously scheduled or intertask events.

A "task-handled trap" allows a task to be interrupted from its normal execution sequence by one of many software or hardware actions, ISC added.

The minis accept ISC's Extended Fortran IV — a superset of Ansi Fortran-66 — as well as Ansi Cobol-74, Basic Level II and assembler.

A family of communications routines called Itam/16 provides the software interface between a user task under OS/16 and facilities such as modems, null modems and the telephone utility, ISC continued. Other software for Antares 300s and 400s includes a text editor, Sort/Merge capability, an interactive debug-

(Continued on Page 74)

Moves On-Line, Gets 'Nonstop'

Berkeley Buttressed Against Failure

Special to CW

BERKELEY, Calif. — The University of California campus here has weathered many strikes and demonstrations, but unprecedented havoc could result if its main administrative computer system went on the blink.

That system tallies enrollment, schedules classes, stores grade records, supports departmental accounting and does other tasks with data bases that are large, dynamic and complex. The system helps organize the activities of 28,000 students who attend some 4,000 classes.

As a consequence of components failures, software bugs or transmission errors, students might be assigned several classes at the same hour, grade averages might be miscalculated or laboratories might lose track of inventories. Countless other calamities might also occur.

Switch to On-Line Processing

The Berkeley campus switched from batch to on-line processing to avoid disruptions caused by lost or mutilated keypunch cards. The transition accompanied the installation of a multiprocessor system that can continue to function without losing much throughput or memory capacity if one of it processors or disk drives fails.

Since last May, Berkeley has relied on Tandem Computers, Inc.'s TC-16 Nonstop computer system. The configuration includes two 228K-byte CPUs, a line printer, a matrix printer, a 1,600 bit/in. tape drive, three 3000M-byte disk drives, two disk controllers and 32 terminal ports. All application programming is done in Cobol.

Although the Tandem system is just one of hundreds of CPUs on the campus, it represents a new direction in the Office of Admissions and Records toward on-line, nonstop processing, with information entered through ter-

(Continued on Page 76)

Business System Built for First-Timer

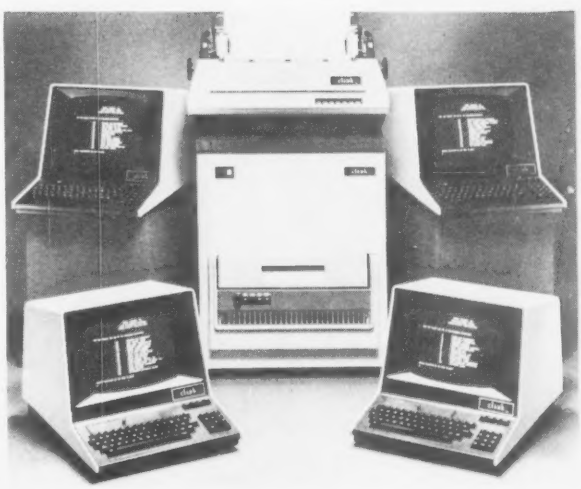
ATLANTA — A small business system for the first-time user that reportedly can be expanded as the need arises is now available from Retail Sciences, Inc.

The Clerk 800 features a 16-bit single-board processor with 64K bytes of memory expandable to 256K bytes, a 32M-byte cartridge disk storage subsystem expandable to 96M bytes, a multitasking operating system and Cobol applications software.

The system also features a 24-line by 80-column CRT terminal for data entry, file inquiry and interaction with applications software. A 200 char./sec matrix printer for report generation is standard; a 300 line/min chain printer and a 45 char./sec formed character printer are options.

The system's real-time multi-

(Continued on Page 76)



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Accepts Galaxy/5 Software

DSC Unveils Galaxy/3 for DDP

WALKERSVILLE, Md. — Digital Systems Corp.'s (DSC) recently announced Galaxy/3 system was designed to function in a distributed data processing (DDP) network and to allow a wider audience of users to utilize the firm's Galaxy technology.

The basic Galaxy/3 configuration includes 96K bytes of main memory, a console CRT, ports for six additional CRTs or modems, a 300 line/min printer and a 25 million character disk system consisting of one fixed and one removable drive.

The basic system can be field-upgraded to support 15 simultaneous CRTs, a second line printer and up to 100 million characters of disk storage.

The Galaxy/3 is software-compatible with the Galaxy/5, and all the major software systems running on the Galaxy/5 are immediately available on the Galaxy/3, a spokesman said.

The base price for a Galaxy/3 is $57,000. A large Galaxy/3 system supporting seven simultaneous users costs less than $1,600/mo.

First shipments are scheduled for early summer from DSC at 3 N. Main st., Walkersville, Md. 21793.

Upgrades Reduced

WALKERSVILLE, Md. — Price reductions on in-cabinet upgrades to Digital Systems Corp.'s Galaxy/5 systems have been announced by the company.

Prices on central processors have been reduced 25% to $7,200. Direct memory address (DMA) processors have been reduced 17% to $6,900 and 64K-byte memory upgrades have been reduced 30% to $6,200.

In addition, the Galaxy 15-port multiplexer is now available in five- and 10-port versions.

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LOS ANGELES — Southern California Computer Expo, Los Angeles Convention Center, (213)741-1151, April 24, 25, 26
HOUSTON — Southwestern Computer Expo, Albert Thomas Convention & Exhibit Center, (713)222-3561, May 8, 9, 10
CHARLOTTE — Southeastern Computer Expo, Civic Center, (704)372-3600, May 15, 16, 17
PITTSBURGH — Northeastern Computer Expo, Greater Pittsburgh Merchandise Mart, (412)243-8716, May 22, 23, 24
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CA Enhances Naked Mini 4

IRVINE, CALIF. — CPU/memory combinations for the Naked Mini 4 family, said to feature "higher density random-access memory [RAM] with faster speeds on smaller cards," result in improvements of up to 61% in price/performance ratios, according to Computer Automation, Inc.

Aimed at OEM manufacturers, the Naked Mini 4 family members — the LSI 4/10, LSI 4/30 and LSI 4/90 — are now available with 32K, 64K and 128K bytes of 580-nsec RAM on a half card (7.5- by 16.9 in.).

The LSI 4/10 is a half-card minicomputer, while the LSI 4/30 and LSI 4/90 are full-card (15- by 16.9 in.) CPUs, according to a spokesman.

An LSI 4/10 processor with 32K bytes that formerly sold for $1,235 now costs $995, including four on-board I/O ports, the spokesman said. With 128K bytes, the new price is $2,595, a net reduction of about 61%.

LSI 4/90 savings range from 17% with 32K bytes to 47% with 128K bytes, he added.

First deliveries of the products will be in May from 2181 Dupont Drive, Irvine, Calif. 92713.

ISC Brings Out Two Mini Series

(Continued from Page 73)

ging system and various utilities.

The minis' directly addressable memory "totally eliminates time-consuming design problems caused by paging and indirect addressing," ISC claimed.

A Model 300 with 64K-byte processor, bootstrap loader, 20mA current-loop interface, RS-232C interface, 1M-byte dual floppy disk system, 30 char./sec dot matrix printer, 1,920-character CRT and cabinet costs $11,000.

The same configuration without the matrix printer but with a 30- to 45 char./sec typewriter printer and word processing software costs $15,000.

A Model 400 with 64K-byte processor, bootstrap loader, 20mA interface, RS-232C interface, 32M-byte cartridge disk system, 200 char./sec dot matrix printer, 1,920-character CRT terminal and cabinet costs $18,000.

This configuration with a 340 char./sec rather than a 200 char./sec matrix printer costs $18,500.

Antares 300s and 400s can be upgraded to 256K bytes of main memory for an extra $3,000. Capacities of 128K and 192K bytes cost an additional $2,000 and $2,500, respectively.

ISC's Cobol compiler costs $5,000; the OS/16 MT2 operating system plus Basic and Fortran costs $250. The vendor's cross-assembler for generating 6800- or 8080-compatible software costs $200.

A 32M-byte cartridge disk system featuring one fixed and one removable disk as well as controller, cables and terminator is tagged at $10,325. A floppy disk subsystem including two 512K-byte disk drives, a controller for up to four drives, power supply, cables and chassis for mounting in a 19-in. Retma enclosure costs $2,500.

ISC is located at 1300 Pickens St., Columbia, S.C. 29211.

Stores Sales Information on Tape

Service Helps Promoters 'Second Guess' Public

By Marguerite Zientara
CW Staff

SANTA CLARA, Calif. — There's nothing harder than trying to second-guess the public, but promoters of entertainment and sports events have found a true blue friend in electronic ticketing services that can provide them with tactical marketing information.

One such service, Ticket Information Computer Systems (Tics), is the original equipment manufacturer for Best Available Seating Service (Bass) Worldwide, which configures, markets and services computerized ticket systems. "We operate in an advisory capacity to everyone who is presenting live entertainment," according to Peter Schneidermeier, marketing director of Tics. "By providing up-to-the-minute reports on total ticket sales for each event, sales at each individual outlet and each outlet's percentage of total sales demographics, we can advise a promoter when to cancel a show, when to switch advertising tactics and how to price a show."

Nine Sites, 17 Minis

The company has nine installations, in Miami, Houston and San Francisco; in Toronto, Vancouver and Edmonton, Canada, and in Melbourne, Adelaide and Sydney, Australia. Each city has a dual-mini computer installation of either Digital Equipment Corp. PDP-11/34s or PDP-11/60s with 128K bytes of main memory except for Edmonton, which currently still has a single machine.

Each computer is capable of keeping track of over 20 million seats; the dual system ensures backup capability.

Three sizes of disk storage systems are used: either 75M bytes raw and 57M bytes formatted; 80M bytes raw and 67M bytes formatted; or 200M bytes raw and 168M bytes formatted.

In addition, each system has Pertec Computer Corp. 125 in./sec T1000 tape drives and a Printronix Inc. 300 line/min P300 printer.

Terminal Network

Each central computer site is connected by telephone lines to 32 to 48 terminals that are set up in facilities ranging from record stores to department stores. Every facility has a Lear Siegler, Inc. ADM-3A CRT terminal connected to a Computer Terminal Systems, Inc. ticket printer that prints a 41-char.-wide, eight-row theater ticket in three seconds.

"When a customer purchases a ticket, the operator keys in the number of tickets purchased and the person who sold them," Schneidermeier explained. "Tickets are printed on the spot and once a ticket has been purchased, it is no longer available anywhere in the system."

In a number of participating cities, a toll-free number can be used to order tickets payable by credit card. In those cases, the tickets are printed and then mailed to the customer.

Sales Data Stored

All tickets sales information is put on tapes that are kept in a library at each central site, ready to be used for marketing analysis purposes. All daily transactions and event inventories from each location are included on the tapes.

"A promoter can call up until 1 a.m. and receive data on current and past events," according to Schneidermeier. "For example, by reviewing the statistics of a similar past show in the same facility as a current show, the computer is capable of analyzing early sales and helps the promoter predict in a matter of minutes the amount of food and support personnel he will need."

The system also has a Research and Development Department that maintains a complete Tics information system.

From there, program updates are sent to the installations, as well as monthly reports of accountability.

Season Ticket Approach

"Eventually we hope to create a program where we can categorize the wide range of events by type," he added. "Customer names will be entered into the system when they purchase tickets."

"We will maintain mailing lists of customers according to the types of shows they attend, which we will store on tape," he continued. "Periodically, brochures will be sent out announcing future events we think might be of interest; it will be a sort of season ticket approach."

Houston may expand its number of terminal outlets to 64 this summer, with other centers following suit as required by sales volume.

Future Possibilities

Possible future sites for central offices include Hong Kong, London, Munich, Detroit, Chicago, St. Louis and Dallas.

"In all of our markets, we presently handle 18 million to 20 million tickets a year," Schneidermeier noted. "With approximately one new central installation every three or four months, we expect to surpass 30 million by the end of the year."

EDP professionals have a word for the new Wang VS computer.

Richard Berger, Vice President and Data Processing Manager, Bughaus, Inc., a Volkswagen service center network headquartered in Hartford, Conn.

"Because we had been using a computer – the Burroughs B1700 – with card input sequential files and no video displays, we suffered long delays and storage constraints.

"Now, with our Wang VS system, storage is virtually unlimited, and we simply recall a screen load of information on the CRT to make a change in seconds – all of this without interrupting our normal flow of work.

"We've put everything in our business onto our VS system, including payroll, accounting, sales and wholesale and retail inventory control. And we did it in 90 days without changing languages and with only minor modifications in almost 90 COBOL programs."

"We are absolutely amazed at the throughput rate we've achieved with our Wang VS. On our very first job for one of the country's largest student insurance agencies, the VS arrived in Pittsburgh on December 23 and was completely installed and operational on-site on February 15, with 61 programs written, debugged and tested – all by only two people – and not a single line of code had been written until the machine came in the door.

"The VS really fulfills all of our requirements, particularly in areas where other systems are weak: cost/performance, language-availability, user-utility software.

"I think the real key for the DP manager is the utilities available with the VS, its speed and its interactive COBOL compiler. These three things combined make for a very powerful tool."

J.P. Scott, Data Processing Manager, Aptech Computer Systems, Inc., Pittsburgh, Pa.

Kenneth W. Cakebread, Manager of Data Processing, Trans-Air Forwarding and Brokerage, Inc., Inglewood, Calif.

"I had 30 days to convert about 220 programs from our old batch-oriented Honeywell 62 system to our new Wang VS system. Not only did I do it. Thanks to the programming power of the VS, I actually came up with more.

"Before we converted to the VS, the biggest problem we had in the accounts receivable area was misapplying cash. No more. Now, by capturing current information and keying it into the computer from a workstation, we're able to sort out potential problems long before they get to the accounts receivable stage. And with Wang's on-line editing capabilities, I'd say we've cut our average editing time on a per-item basis from 30 seconds to a single second.

"And believe it or not, while the VS gives us faster access and maybe triple the programming efficiency of our old system, it was only half the cost."

EDP professionals in more than 100 companies are singing the praises of the Wang VS. And for good reason.

The VS is a remarkably sophisticated, fully expandable virtual storage computer designed to provide maximum interaction in a mainframe environment.

The VS provides for distributed data processing, thus avoiding costly consumption of mainframe resources. It's fast, responsive, ease to use and can support up to 2.3 billion bytes of on-line storage. What's more the VS speaks EDP people's language: COBOL, BASIC, RPG II and ASSEMBLER.

We also think you'll appreciate how simple the VS is to operate. In fact, because of its level of sophistication, it can be operated by people with little or no computer-related training or experience.

One more thing: the entry level price of the VS is under $50,000. Which is perhaps the most remarkable thing of all about this computer.

For more information on the VS, return this coupon to Wang Laboratories, Lowell, MA 01851.

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Berkeley Buttresses Itself Against DP Failures

(Continued from Page 73)

minals placed wherever they are needed. The system is accessed by 26 terminals located in various administrative offices.

"Not all our applications are or will be running through on-line terminals," Admissions and Records associate director Bruce N. Benedict said. "We will put as many applications on-line as feasible. In fact, we may have as many as 60 terminals accessing the computer by the end of 1979.

"This will give us better control over the information that is input into the computer and will reduce the wasted time and numerous errors that crop up with card-oriented batch systems," Benedict explained.

Class Scheduling

One application that demonstrates the benefits of this approach is class scheduling. The first phase of this application, now completed, creates a data base of all courses offered on the campus, including information on sections, meeting times, locations, instructors, course units and class descriptions.

The second phase, now in development, will include information on space and equipment facilities for every instructional area at Berkeley.

Phase One is reportedly used to double-check class scheduling for the winter quarter. Phase Two will provide for "instantly" retrievable listings of available facilities in the future.

"By going on-line for class scheduling, we expect to save about $20,000 a year," Benedict said. "Instead of filling out keypunching forms, punching them from key to tape, doing a batch update, producing an error list and generating a file printout to make necessary changes — which takes a great deal of time and manpower — all we have to do now is key the data directly through a terminal into the computer."

Terminal operators are Admissions and Records personnel, not computing services data entry clerks, Benedict noted. With more insight into "what the data is supposed to look like," the operators catch many errors that data entry clerks would not notice.

"Moreover, the computer itself automatically checks fields for validity as data is being entered. There are no long waits for corrections, since the operator can make the changes directly through the terminal," Benedict continued.

Registration Application

An on-line registration packet application has proved especially successful, Benedict said. Before the Tandem system was installed, students who lost or never received their registration packets often had great difficulty completing registration.

But the TC-16 allows a student to go to a registration window of the Admissions and Records building, tell the registrar that a packet — which contains 15 different cards — is needed and pick up the packet the next day.

The student's name and other information is keyed into the terminal and output onto tape by that evening. The tape is then taken to the mainframe that actually prints the packet.

An on-line accounting application that will help research units and academic departments track the flow of grant funds from various government agencies is now under development.

"The current batch system is so cumbersome, so far behind reality, that the departments need to create their own special manual systems to track the money flow on a day-to-day basis," Benedict said. "These manual systems will be dropped as soon as the on-line system is completed."

The TC-16's file management system, called Enscribe, was termed "fast and easy to use." Able to handle up to 4G bytes of information per file, Enscribe "never goes down," he declared.

About a year ago, Berkeley relied on an on-line mini's support of administrative functions, but the system was rejected because it lacked a satisfactory file management capability and kept crashing.

How Reliable Is It?

How reliable is the TC-16? Recently "a system programmer turned off the main disk drive to do some special work," Benedict said. "But he forgot to turn it on again when he was finished.

"The next day I was walking by the drive and noticed that the disk select light wasn't on. The following day, I noticed that the access arm was not moving. We then checked to see what had happened."

"The disk drive had been down for a day and a half, but everything had continued running. The system just switched over to the 'mirror' disk drive, an exact replica of the main disk.

"When we turned the main drive back on, the system automatically updated the main drive and switched back to it."

Expandable Business Unit Built for First-Time Users

(Continued from Page 73)

tasking operating system is said to optimize resources in real-time, as well as program development and computational environments.

A Cobol runtime translator executes application software; a Basic interpreter and an extended Fortran IV compiler and runtime library are also included, a spokesman said.

A user can choose one of the following applications packages: general ledger, payroll, accounts receivable, accounts payable or inventory management. Additional packages, including sales order processing and client posting and accounting, can be purchased separately.

All Clerk applications software runs in Cobol conforming to Ansi Standard X3.231974 and was developed in an IBM-like environment "to maximize transportability and compatibility with existing compilers," the spokesman said.

The Clerk's Basic language employs the conventions of Dartmouth Basic as well as such user aids as program tracing facilities and immediate syntax error checking, the spokesman claimed.

The Clerk's Extended Fortran IV reportedly exceeds the requirements of Ansi Standard X3.9-1966. According to the spokesman, the compiler typically operates in as few as 21K bytes and directly generates object code, thereby minimizing the I/O needed to compile.

The basic price of the system is "under $30,000," he said from 3384 Peachtree Road, N.E., Atlanta, Ga. 30326.

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Disk Emulation Subsystem Fits DG Minis Under AOS

CRANBURY, N.J. — A 2M-byte disk emulation subsystem for Data General Corp.'s Nova, Supernova and Eclipse minicomputers running under either the Advanced Operating System (AOS) or Real-Time Disk Operating System (RDOS) is available from Dataram Corp.

The BC-303 subsystem holds four to eight 256K-byte bulk core memory modules. The host mini can accept up to four BC-303s for a maximum disk capacity of 8M bytes, Dataram said.

Two minis can share a single subsystem via an optional dual port, a spokesman added.

The Dataram subsystem emulates DG's 6063/6065 fixed-head disk subsystem and, like that subsystem, generates a 32-bit emitter-coupled circuit checkword for each 256-word block it stores. The independent product can use either the standard or high-speed data channel interface, Dataram added.

The BC-303's maximum data transfer rate is 1M byte/sec; its average access time is 16 microsec, the spokesman said. Compatible with fixed-head disk diagnostics, the subsystem has eliminated "data late" conditions, said to be a common occurrence when fixed-head disks are used. An off-line test capability is standard.

The BC-303 interfaces to the host mini via a 15- by 15-in. controller board that plugs into any available I/O slot, the vendor added.

The minimum 1M-byte BC-303 configuration costs $26,400. A single-chassis 2M-byte subsystem costs $42,000, while a four-chassis 8M-byte configuration goes for $143,800. Regardless of storage capacity, the dual-port option costs $2,000.

Dataram is at Princeton-Hightstown Road, Cranbury, N.J. 08512.

Book Discusses Use of Minis In Libraries

WHITE PLAINS, N.Y. — Minicomputer systems are moving libraries toward more efficient patron service and improved manageability, according to a state-of-the-art report, *Minicomputers in Libraries, 1979-80*, by Audrey N. Grosch.

Published by Knowledge Industry Publications, Inc., the 142-page softcover book deals with distributed processing in libraries, existing minicomputer hardware and software, the pros and cons of disks vs. cassette tape and the nature of various input and output services, communications equipment and other hardware, according to the publisher.

The work indicates the major application of minicomputers in libraries is in circulation control. These systems permit libraries to keep an on-line file of their holdings and to provide an accurate, up-to-date record of items on loan, their due dates and their borrowers, according to the publisher.

The study also indicates that program reliability and customer response are improving, new functions are being added by most commercial vendors and connections with other bibliographic systems are moving toward direct on-line computer-to-computer interaction.

Grosch concludes that available storage and memory have grown enough that many libraries can now have fully on-line catalogs.

A professor in the Library Systems Department at the University of Minnesota, Grosch is the immediate past president of the American Society for Information Science. She was a consultant for the Pahlavi National Library of Iran.

Minicomputers in Libraries, 1979-80 costs $24.50 from Knowledge Industry Publications, at 2 Corporate Park Drive, White Plains, N.Y. 10604.

Band Printers Bow

STAMFORD, Conn. — A series of band printers operating at 300-, 600- and 900 line/min has been introduced by Digital Associates Corp. (DAC). The printers are plug-compatible with Digital Equipment Corp.'s PDP-8, PDP-11 and Decsystem-20, Data General Corp.'s Nova and Eclipse, Hewlett-Packard Co. units, the IBM Series/1 and Interdata Corp. equipment, according to a spokesman.

Called the B series, the band printers are also reportedly compatible with RS-232C and other data communications interfaces.

The printers feature an operator control and fault indicator panel, 69 interchangeable print bands in 22 languages and swing-out yoke and in-line paper tractors for forms loading, the spokesman said.

Self-test procedures allow all printer functions to be exercised off-line for ease of maintenance and fault indication, the spokesman said. Other features include Ascii print coding, a 132-position line length, a forms length selector switch and 48- and 96-character sets.

The 300- and 600 line/min models offer 15 char./in. density, reportedly allowing the user to achieve a paper saving of 40%.

Prices for the series range from $5,995 to $12,995, DAC said from 1039 E. Main St., Stamford, Conn. 06902.

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Small systems haven't replaced big systems, they've amplified their power through communication networks and a hierarchy of new applications. This leverage has just begun, according to the panelists who will be assembled for Future Systems Forum-II to be held at the Boston Museum of Science, May 22 & 23. The full range of small systems from board oriented through E Series will be discussed by leading consultants, vendors, users and university authorities. Building on the success of Future Systems Forum I, which was oriented to large system applications and technology, FSF-II will pack each program minute with new insight as to the economics, risks and payoff of future small systems applications and technology.

The Future Systems Forum-II on "Small Systems Power in the 1980's" will address key issues such as:

- Accelerating price performance trends in small systems, as users get closer to the processing power provided by advanced semiconductor technology. Which vendors will give the best package?
- Big mainframe software tools such as data base management systems will "fit" into small systems. How will this impact the use of large mainframes?
- Re-decentralization of data processing and files may occur as branch offices and plants again reinstall their own system instead of terminals. How will central management control this data base proliferation?
- All mainframes in a network environment boost demands for economical, high speed, broad bandwidth data communications. How will the carriers meet this challenge?
- Plug compatible mainframes will cover the full range of the IBM product line. How will users sort out the vendors? What role will service organizations selling small main-frames play?

Speakers already scheduled for the FUTURE SYSTEMS FORUM include:

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Chairman
International Data Group
User Expectations in Small Systems Technology

Doll

Michael Senft
Marketing Director
Nanodata
Microcode and Small Systems Architecture"

Dr. Dixon Doll
President, DMW Associates
Communication and Data Base Opportunities in Small Mainframes"

Alan Baumgartner
Director of Strategic Planning
National Semiconductor Corp.
Systems Group

Fertig

Robert A. Fertig
Vice President & Director
Technology Analysis Group Advanced Computer Techniques, Inc.
E-Series Technological and Market Impact"

David Crockett
Systems Architect
Hewlett-Packard
Impact of Computer-on-a-Chip Technology on Small Mainframe Performance"

Mertz

C. Oakley Mertz
Vice President - Research
International Data Corp.
Market Structure and User Migration Dynamics in the Small/Mid-Range Mainframe Arena"

Additional User/Vendor/Consultant speakers will be announced.

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Please reserve ——— space(s) @ $500 per attendee at the two-day FUTURE SYSTEMS FORUM. I am including the names of all those (besides myself) who will attend on a separate piece of paper. I understand that the fee includes FORUM materials and reproductions of speakers' visual aids, lunches, refreshments, cocktails-*but not hotel accommodations*. I further understand that cancellations must be made by May 10 or be subject to a $150 charge.

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Tape System Built For PDP-11 Users

ANAHEIM, Calif. — Expanding the peripherals options for Digital Equipment Corp.'s PDP-11 minicomputer is Datum, Inc.'s recently announced Model 1520 embedded tape system.

The Model 1520 controller features 16-bit microprocessor control and occupies a single SPC slot, according to a Datum spokesman. The unit also offers word transfer of data when byte transfer is not necessary, as well as odd or even starting addresses and byte counts.

The single-board magnetic tape controller interfaces to the Datum D-450 tape drive or any industry-standard drive. Up to four drives can be interfaced. In addition, any combination of speed and density can be used, the spokesman claimed.

The single-board Model 1520 costs $3,000, while the single-drive system starts at $6,900. Datum is at 1363 S. State College Blvd., Anaheim, Calif. 92806.

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For Users of DEC Minis

Console Emulator, Loader United

IRVINE, Calif. — A fixed console emulator and bootstrap loader for Digital Equipment Corp. minicomputers is available from Able Computer Technology, Inc.

To ease the operation of DEC's PDP-11/05, PDP/10, PDP/35, PDP/45, PDP/50 and PDP/55 minicomputers, Able's Emuloader allows the use of fixed console emulator functions by the processor from the console or most terminal devices.

A memory diagnostic is run on all installed memory when the Emuloader is initialized through the console emulator start address, Able said. The device provides loaders for DEC's DL11, PC11, RC11, RK06, RK11, RM02/03, RPOY/05/06, RP11, RS03/04, RX11, TC11, TM11 and TU16 peripherals.

Devices can be booted from the terminal or manually from the switch console by the appropriate address.

Since the Emuloader replaces the standard bus terminator, its advantages to the user may be realized without the loss of any backplane space in the CPU, Able claimed.

With quantity discounts available, the Emuloader costs $395. Able is at 1751 Langley Ave., Irvine, Calif. 02714.

Keypunch Controller Fits Micros, Minis

HOUSTON — A keypunch controller designed for minicomputer and microcomputer users is available from the Digital Products Division of Comspec, Inc.

The DP2029-EIA controller allows punching of cards from any standard asynchronous RS-232C communications line equipped with hardware hold-off capabilities, the vendor said. For lines that lack this feature, the user can reportedly delay or transmit nulles for card releases, character or feed delays.

Transmission speed is selectable in the 110- to 9,600 bit/sec range, Comspec said.

The unit buffers up to two characters. The carriage return is configured as the standard card release, Comspec stated.

The controller can punch all standard upper case Ascii characters and numerals and convert them to their Hollerith equivalents, the vendor continued. All nonprintable characters sent to the controller are ignored and not punched.

Prices for the controller start at $1,500. Comspec's Digital Products Division can be reached at P.O. Box 79438, Houston, Texas 77079.

LSI-11 Gains Card Reader

FRAZER, Pa. — A 300 card/min, 80-column card reader for Digital Equipment Corp. LSI-11 and PDP-11/03 users is available from Cardamation Co.

The CR 300/21 is compatible with DEC's CR 11 hardware and software, which operate on the medium-sized and larger PDP-11 systems, according to a Cardamation spokesman.

The unit includes a vacuum feed 300 card/min card reader mechanism, case work, electronics, interface cable and a dual-size module that mounts in a one-half quad slot, the spokesman noted.

The CR 300/21 costs $3,550; quantity prices go down to $2,375. Cardamation can be reached at P.O. Box 835, Frazer, Pa. 19355.

DEC Micros Get Memory

HOUSTON — Memory expansion of the Digital Equipment Corp. LSI-11, LSI-11/2 and PDP-11/03 can be effected by Computer Extension Systems, Inc.'s VML 1116 semiconductor printed circuit board with 250 nsec access time and 350 nsec cycle time.

The VML 1116 provides 16K bytes of 16-bit words of memory, in four independent 4K-byte increments, on a dual-width board, according to a spokesman.

Reportedly compatible with all software systems, the unit has a dual in-line package (DIP) switch that allows memory operation to 124K.

The VML 116's NMOS static random-access memory design is said to eliminate the need for refresh circuitry.

The VML 1116, which comes with a one-year warranty, costs $950 from the firm at 17511 El Camino Real, Houston, Texas 77058.

System Built For Business

LA JOLLA, CALIF. — A repertoire of business accounting software programs comes with the 64K-byte CPU announced by Micro Business Applications, Inc. for the end user.

Housed in a standard 60- by 30-in. secretarial desk, the Micron-740 features a fixed disk with at least 6M bytes of capacity, a 125 line/min printer, a cartridge magnetic tape drive, a CRT and a typewriter-style keyboard.

The system is supported by a conversational operating system, text editor, Basic compiler and the Micro Data Base Manager. Applications programs include accounts receivable, inventory control, sales order entry, professional service time accounting, general ledger, purchase order tracking, accounts payable and payroll.

Each application can be implemented independently or combined into a completely integrated accounting system. The present staff of a company can learn to operate each module with only a few hours of instruction, Micro claimed.

The Micron-740 can be leased for less than $600/mo. Each software module costs $500, the vendor said from P.O. Box 2888, La Jolla, Calif. 92038.

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Handles Many Applications

Micro Plows Through Bank's Paper Stack

By Ann Dooley
CW Staff

MCKINNEY, Texas — A savings and loan association here accumulated a backlog of in-house paperwork that was postponed or simply ignored by bank personnel because of the time and expense that would have been required to process it. Bank officials didn't want to tie the work into the on-line computer system, and manual methods were inadequate for the complexity and volume of work.

So the First Savings Association of McKinney purchased a microcomputer system to handle those banking functions previously performed manually. The microcomputer system filled the void and even went beyond it, entering into new application areas, according to Glen Hickman, the bank's president.

The microcomputer was purchased about three years ago when it became evident that something had to be done. The work had become too voluminous for the standard manual methods; service bureaus didn't seem to want to take on a "small" job; and the bank didn't want to overload its on-line system, Hickman explained.

A microcomputer seemed to be the perfect solution, offering both cost savings and in-house control.

The micro, an Imsai Manufacturing Corp. system, now handles the bank's payroll, its general ledger, a bank reconciliation program for checkbook balancing and a financial calculations program. The system supports escrow analysis, a Federal Home Loan Mortgage Corp. reporting program, amortization of deferred fees, loan warehousing and packaging and amortization schedules.

The system also copes with cash flow models, access gain/loss on sale of participations and a loan closing program.

The relatively low cost involved was undoubtedly one reason the bank chose a microcomputer system as the answer to its problem, but after using the system for several years, other benefits were readily apparent, Hickman noted.

All the programs were tailor-made to suit the bank's needs while control over the information was kept in-house. Cost savings in personnel were also possible. For example, the bank reconciliation program, which is just one of the microcomputer's duties, was formerly handled full time by a bank employee.

The automated system has also sped up processing time while providing more accurate calculations than were ever possible before, he said. Moreover, the system can be expanded to meet the bank's needs.

"We've been pleased with it from the first," Hickman remarked. "The service has always been good, and we've experienced very few problems in hardware and software." Furthermore, the staff required no special training because the system leads the operator through the programs, he noted.

Equipment Involved

Built around the Imsai 8080 with 40K bytes of memory, the system includes a Diablo Systems, Inc. terminal and printer and dual floppy disk storage devices from Icom, Inc.

Programs are written in Basic, and the language interpreter is Disk Basic Etc, an advanced file management and disk operating

(Continued on Page 80)

General-Purpose Beck-1/System Digitizes, Displays TV Input

NEPTUNE, N.J. — Combining a general-purpose microcomputer system with a programmable display processor capable of digitizing a TV input signal and displaying a digital TV picture, the Beck-1/System from Beck Corp. comes in a number of prepackaged configurations or can be configured for a particular user.

The system includes a Zilog, Inc. Z80 MPU, up to 64K bytes of random-access memory (RAM), 32K bytes of read-only memory (ROM), serial and parallel I/O ports, floppy disk storage including both mini and standard floppy drives, a keyboard and a CRT display.

A direct memory access (DMA) controller, real-time clock and floating-point arithmetic unit are also available, the firm said.

The display processor contains up to 32K bytes of image RAM, which can be displayed as characters, graphics or a digital TV picture. Programmable parameters include character and pixel size and count.

Software available with the system includes the CP/M operating system and Basic; a program development package with Pascal and three-dimensional graphics will be added soon, according to a spokesman.

Firmware includes the Beckmon-1 system monitor, containing basic console functions and disk bootstrap as well as I/O driver routines for all system devices. Beckplot-1, which contains an I/O driver and plotting routines for the display processor, gives the user complete display control from high-level macro calls, the spokesman said.

The system can be used in industrial non-contact measurement, surveillance, medical

The Beck-1/System

X-ray, ultrasound and bacteria and cell analysis applications.

The Beck-1/System ranges in price from $2,900 for the Beck-1/30A, a basic system with no disk storage, to $6,800 for the Beck-1/50C, which includes a TV, graphics and digital TV display, 32K bytes of RAM and dual standard floppy disks.

Beck is at 303 Slocum Ave., Neptune, N.J. 07753.

Handbook Outlines TRS-80

FORT WORTH, Texas — Radio Shack has published a technical reference handbook for its TRS-80 microcomputer that includes information and schematic diagrams for both Level I and Level II systems.

The illustrated, 108-page book is intended primarily for technically oriented persons with a working knowledge of digital logic circuits. Topics include the theory of operation, adjustments and troubleshooting, connections to external devices, a parts list and foldout schematics.

The *TRS-80 Microcomputer Technical Reference Handbook* costs $9.95 and is available from participating Radio Shack stores and dealers worldwide.

Micro Chips

'Databook' on Series/80 Free From National Semi

SANTA CLARA, Calif. — National Semiconductor Corp. is offering free of charge its "Databook" on the Series/80 family of microcomputer products.

The "Databook" includes descriptions, photos and conceptual diagrams of six board-level computers, three rack-mounted computer systems and three prototyping systems, all based on the 8080A microprocessor. More than 30 supporting products are also described.

All products are Mutlibus-compatible and are warranted for one year.

The "Databook" is free by request on company letterhead stationery from National Semiconductor Corp., C.P.G. marketing Services, MS/10A190, 2900 Semiconductor Drive, Santa Clara, Calif. 95051.

Seminars on ISBC 86/12 Planned at 21 Locations

LOS ANGELES, — Hamilton/Avnet Electronics, Inc. and Intel Corp. will conduct free seminars on Intel's ISBC 86/12 single-board computer and other computer products during the next three months at 21 locations nationwide.

Information on specific dates, locations, and reservations is available from Dave Resnik, Computer Product Marketing Director, Hamilton/Avnet Electronics, Inc., 10950 Washington Blvd., Culver City, Calif. 90230.

Course on 8085 Slated

SAN DIEGO — An intensive short course on "Microprocessors — Understanding and Applying the Intel 8085" is being offered by Evolving Technology Seminars on April 25-27 here.

The hands-on course, which will be held at National University, features the Intel Corp. SDK-85 microcomputer system design kit.

The course costs $375 or $625 with the kit. More information is available from Dr. Donald Rauch, Evolving Technology Seminars, 3720 Jennings St., San Diego, Calif. 92106.

Pro-Log Prom Programmer Now Handles Intel MPUs

MONTEREY, Calif. — A generic personality module that enables Pro-Log Corp. Series 90 programmable read-only memory (Prom) programmers to program Intel Corp's. single-chip microcomputers and related support devices has been introduced by Pro-Log.

The Model PM9054 was designed to allow programming of all generic Intel MCS-48 device types. It provides the control lines and timing necessary to list, program, duplicate and verify the device memories using Pro-Log's M900 and M900B Prom programmer master control units, a spokesman said.

The PM9054 contains the specialized interface, power and programming electronics, pinout adapters and configurators that automatically adapt the Series 90 displays and interface electronics to the appropriate pinout configuration, bit structure and memory size, according to the firm.

Handles 8741, 8748

Also available for the PM9054 are pinout adapters and configurators to program the 8741 and 8748 microcomputers and the 8755A erasable programmable read-only memory (Eprom) with I/O.

The Model PM9054 costs $450 from Pro-Log at 2411 Garden Road, Monterey, Calif. 93940.

Faire Set

SAN FRANCISCO — The Fourth West Coast Computer Faire will be held May 11-13 in San Francisco's Civic Auditorium and Brooks Hall.

The Faire will focus on low-cost computing power for home, business and industry.

Approximately 250 exhibitors, more than 100 speakers and between 12,000 and 16,000 attendees are expected to come.

Preregistration Fees

The Faire will cost $7 by preregistration from local computer stores for the three days of exhibits and conferences and $9 at the door.

More information is available from Computer Faire, 333 Swett Road, Woodside, Calif. 94062.

AJ Introduces Diskette System

SAN JOSE, Calif. — Anderson Jacobson, Inc. (AJ) has introduced the AJ 460, a 5.25-in. minifloppy disk for use between existing Ascii printers or CRT terminals and their RS-232 modems.

The AJ 460 offers more than 204K of nonvolatile storage on reusable media to minimize input time, telephone connect time and remote computer data

The AJ 460

storage costs, the firm said.

Users can directly address any line, search for a single or multiple occurrence of a character string and play back recorded data by character, word or line, according to AJ.

Data can also be recorded in binary mode, which allows the AJ 460 to be transparent to all control and escape codes, or in pack mode, which eliminates the line-by-line recording method and gives maximum data storage efficiency, the firm noted.

The AJ 460 costs $1,995 from local AJ sales offices or from Anderson Jacobson, Inc., 521 Charcot Ave., San Jose, Calif. 95131.

Micro Plows Through Paper

(Continued from Page 79)

system from Binary System, Inc. of Richardson, Texas.

All the programs were written for First Savings by Dallas-based S&L Systems, which specializes in programming applications for the savings and loan industry.

No new equipment is planned, according to Hickman, but new programs are being implemented all the time.

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Ask Major Revisions

Associations Rally Against Export Act

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — Declaring that the ability of U.S. high-technology companies to compete abroad is essential to the health of the U.S. economy, representatives of the American electronics industry recently asked Congress to streamline government export controls.

Members of several trade associations testified before the Senate Subcommittee on International Finance, which held a series of hearings this month on the Export Administration Act. That 1969 law, the basis for the present export licensing system, has been criticized as time-consuming, unnecessarily complex and unresponsive to exporters.

The industry representatives lobbied for extensive revisions to the act, which is scheduled to be extended.

In previous testimony before the same Senate panel, U.S. Commerce Department Secretary Juanita Kreps claimed that 96.7% of all export license applications are processed in 90 days or less. Unfortunately, the remaining 3.3% "represents 100% of the export license applications of our industry," according to George Bardos, a Control Data Corp. vice-president speaking for the Computer and Business Equipment Manufacturers Association (Cbema).

"A significant number of applications filed by the computer and business equipment industry — nearly 50% — are for equipment of such low performance that it should not need any licenses at all," Bardos said. "And yet we can expect delays in processing of at least six months for the simplest cases that fit within the U.S. guidelines. . . . For significant cases, an entire year may go by before we receive a decision.

"Beyond doubt, restrictive federal regulations have impeded the exports from our country, particularly in that segment of the export market where the U.S. holds a competitive but disappearing edge — the export of high-technology products," Bardos stressed.

Electronics' Balance Favorable

Bardos joined spokesmen for the Electronics Industry Association (EIA) and the American Electronics Association (AEA) in noting that while the U.S. suffered a general trade deficit in 1978 of more than $34 billion, U.S. electronics manufacturers are enjoying an international trade surplus of billions of dollars.

But that favorable balance of trade is seriously threatened by outdated export restrictions that, while designed to protect national security, in fact do little more than give other Western nations a competitive advantage in the international marketplace, they told the subcommittee.

Major complaints voiced against the present export license system were that U.S. firms have difficulty obtaining licenses to export products that are readily available from other countries and that even when licenses are granted, the review process is often so lengthy that prospective foreign buyers prefer to do business elsewhere.

The main effect of the controls, it was argued, is to make U.S. companies seem unreliable suppliers. Bardos complained that the Carter Administration has called for increased exports, but has done little to make export controls more conducive to increased international trade.

Revisions Asked

The association executives asked the Senate panel to consider several areas of export control revision. First and foremost, the revised export law "must state in clear terms the sense of the Congress that exports are a high national priority . . . and that exporting is a right, not a privilege, subject only to considerations of military security, short supply or extreme foreign policy considerations," EIA President Peter F. McClosky said.

Speeding up the review process is a prior-

(Continued on Page 86)

Spirited Lomac President Likes The Excitement of Cliff-Hanging

By Marcia Blumenthal
CW Staff

SUNNYVALE, Calif. — "Murphy's Law struck Lomac with a vengeance during 1978," John Peers, president of Logical Machine Corp. (Lomac) recalled with a grimace. "We had substantial losses in 1978."

But momentary setbacks like financial losses don't dampen Peers' spirits. The transplanted Briton, whose offhand comments are quotable gems, has resiliency.

What brought him to the U.S.? "I wanted the opportunity to fail. The motivation to survive is immense when you are falling off a cliff."

In England, Peers felt, he no longer had that opportunity. Trained as a chemist, he later became a systems analyst and started a company which he compared to Basic/Four Corp. When the oil embargo hit the UK in the mid-1970s, however, there was no electricity to run computers, so Peers sold out and emigrated to the U.S.

Since coming to the U.S., Peers has been doing a lot of dangling from cliffs, but the climbing ropes have held. Lomac's anchor product is the Adam computer, which was designed to be programmed by inexperienced users. About four months ago, Adam got a sister named Tina, a smaller system. Peers avoided selecting the obvious name — Eve — and came up with Tina from "tiny Adam."

The company broke even in November 1978. Estimating each of Lomac's 55 distributors would sell one Adam or Tina system a month, Peers recently found, much to his surprise, that about 20% of Lomac's distributors are averaging sales of about five to seven systems a month.

Byte: A Cliff-Hanger

Part of Lomac's cliff-hanging activity resulted from acquiring Byte, Inc. in October of 1977, which was renamed Byte Industries. Peers found retailing very different from selling business computers. "So think twice, double square it and double it by 10 if you are looking at the retail market," he warned.

However, Byte has not bitten the dust. Peers considers the retailing of business systems to be a major opportunity. Lomac will begin distributing its products through the 80 independently owned Byte shops this year. Fueling that decision is the changing product mix of these shops, which are now featuring more business systems.

The key to retailing, as Peers sees it, is having multibrand shops. "Offering people a choice is a basic rule of retailing," he asserted. "It's so easy to be cocky in this business. If you understand a nanosecond, you don't necessarily understand business."

John Peers and Adam

Peers considers retailing a highly desirable distribution method, but he is approaching the retail market cautiously.

Although he eyes the retail market conservatively, Peers had no doubt about forging

(Continued on Page 82)

Nine Mini Vendors Making Pitches to the Chinese

By Mary Rosenberg
CW Staff

SAN FRANCISCO — Representatives of nine U.S. minicomputer manufactuers left for China last week to make product presentations to the Chinese Electronics Society, an organization responsible for evaluating electronic imports to the country.

The companies participating in this trade mission are Burroughs Corp., Control Data Corp., Data General Corp., Four-Phase Systems, Inc., Honeywell, Inc., Inforex Corp., MSI Data Corp., Qantel Corp. and Univac.

For these mini makers, the mission will serve as a vehicle to look into the market potential in China, according to Sandra Mardigian, associate director of California Trade Delegations, Inc., organizer and sponsor of the mission.

The two-week "shopping expedition for the Chinese" is a "preliminary step for the U.S. companies to talk about what they have to offer, but ultimately they are interested in getting customers," Mardigian said.

As in most trade missions, the individual firms are picking up their own tabs for basic travel and accommodations plus an undisclosed commission paid to California Trade Delegations, she noted. The Chinese arrange for travel within the country, which includes visits to Hong Kong, Peking, Shanghai and Canton.

Each company sent one to three representatives, including engineers and managers in such areas as international marketing, new business development and systems and software support. Each firm will make its own slide presentations, and some are bringing equipment.

This is California Trade Delegations' first mission to China. The company, a private

(Continued on Page 87)

Adapso Events to Focus on Services Industry

ARLINGTON, Va. — The computer services industry will be the focus of two spring events sponsored by the Association of Data Processing Service Organizations, Inc. (Adapso) here.

Adapso will hold a seminar on applying minicomputers and microcomputers in the data processing services industry April 24-25 at the Opryland Hotel in Nashville, Tenn. Its 50th Management Conference will begin on May 16 and last for three days at the Shoreham Americana in Washington, D.C.

The two-day seminar will include presentations and discussions on product design, staffing, equipment and financial considerations. Participating organizations will include NLT Computer Services Corp., Monchik-Weber Associates, Computer Task Group and Input.

At the management conference, some 50 representatives of the computer services industry will address such issues as personnel recruitment, retention and training; opportunities in word processing; IBM's recent announcements and their impact on computer services; selling services to the government; and the role of computer services companies in the hardware market.

This year's keynoter will be Sen. Thomas F. Eagleton (D-Mo.), who will discuss the impact of federal regulations on the private sector. Other government representatives — including Dr. Jeffrey Krause, deputy chief of the Federal Communications Commission's Office of Policy Plans — will serve as conference panelists.

In addition, Sen. Claiborne Pell (D-R.I.) will host a reception and columnist Art Buchwald will make a dinner presentation.

The conference fee is $300 for Adapso members and $450 for nonmembers. Adapso members can attend the mini/micro computer seminar for $275; the cost to nonmembers is $350.

More information on the conference and the seminar is available from Adapso at 1925 N. Lynn St., Arlington, Va. 22209.

Peers Likes Cliff-Hanging

(Continued from Page 81)

ahead with production of his Adam computer. However, he conceded the U.S. market has been slower than he expected in realizing the potential of programmerless business systems.

The recent spurt in sales of Adams and Tinas, however, indicates to Peers that the time has come for these products.

The basic premise for Adam's existence, according to Peers, is that language is a complex, interrelated set of logical rules which can be programmed into the machine, thus saving users the task of learning the computer's language.

"The minute you are free from programming, the question becomes not whether to have a computer, but which one to have. This is when retailing becomes vital," Peers stressed.

What do programmers think of Peers? "Oh, they hate me," he said with relish.

Always on the lookout for new ventures, Peers bought 60% of Centigram Corp., a company developing voice recognition applications. Peers believes machines operating in conversational English, or any other language, will be feasible in three to five years. This development will send shock waves throughout the industry, causing skyrocketing demand.

"In two to five years, machines will be able to recognize a fairly extensive spoken vocabulary of 300 to 600 words," Peers predicted. The cost of the technology will drop dramatically, he concluded.

While Peers may admit his ideas are usually ahead of the times, he fully expects to begin reaping the profits when the time arrives.

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Computer Micrographics
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Thursday
Data Base Management Systems
Printers for Low-Cost Systems
Packaged Software
Impact vs. Non-Impact Printers

ST. PAUL — Twin Cities Computer Expo, Civic Center, (612)934-7361, April 3, 4, 5
SAN FRANCISCO — Northwest Computer Expo, Civic Auditorium, (415)558-5065, April 17, 18, 19
LOS ANGELES — Southwestern California Computer Expo, Los Angeles Convention Center, (213)741-1151, April 24, 25, 26
HOUSTON — Southwestern Computer Expo, Albert Thomas Convention & Exhibit Center, (713)222-3561, May 8, 9, 10
CHARLOTTE — Southeastern Computer Expo, Civic Center, (704)372-3600, May 15, 16, 17
PITTSBURGH — Northeastern Computer Expo, Greater Pittsburgh Merchandise Mart, (412)963-8716, May 22, 23, 24
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Executive Corner

- Richard J. Reichler has been named controller of Innovative Computer Products.
- A. Don Branum has been promoted to vice-president and general manager of Harris Corp.'s Satellite Communications Division.
- Gene Parrett has been named director of financial planning and analysis at Inforex, Inc.
- Anthony S. Graci has been appointed assistant vice-president of the western region at Teldata Systems Corp.
- Franklin M. Jarman has been named to the board of directors of DSI Corp., the parent company of U.S. Datacorp.
- Christopher R. Crawford has been named assistant vice-president of International of Pansophic Systems, Inc.
- Floyd H. Jean has been named program director of Computer Sciences Corp.'s $221 million contract with Saudi Arabia; Dr. Fernand R. Nakache has been appointed a vice-president of the Systems Division.
- Edward C. Thompson has been named director of operations of Data Services International, Inc.

If Congress Approves '80 Budget

Commerce's Trade Program Faces Budget Cut

By Marcia Blumenthal
CW Staff

WASHINGTON, D.C. — Funding for the international marketing program operated by the U.S. Department of Commerce will be cut in half if the budget proposed for fiscal 1980 is approved.

While top management at the Commerce Department has given the nod to the cut, which it said will result in a more flexible system at a lower cost, others within the agency are skeptical of the results of a greatly reduced budget.

In particular, the closing of the trade center in Mexico is a sensitive issue. Sources in Mexico City recently expressed apprehension about the probable loss of the trade center in that city.

In the course of preparing an article about the closing of the trade centers, a *New York Times* reporter queried the agency about the proposed $4 million budget cut, singling out the political advisability of closing the Mexican trade center. That inquiry prompted Frank A. Weil, assistant secretary for industry and trade at the Commerce Department, to explain the department's rationale for the changes.

Five Centers in Operation

Currently, the department operates five trade centers. Every center has its own exhibition space and mounts six to eight shows per year consisting of about 30 to 40 exhibitions each.

The Commerce Department has 15 to 20 industries targeted for promotion in overseas markets. Of these, three industries are in product categories related to the computer industry, according to Peter Ryan of the Office of International Marketing.

In explaining the changes, Weil said the department "plans to restructure its overseas exhibit activity, moving away from a fixed facility with its own exhibit space to a program utilizing existing overseas trade fairs as well as producing solo exhibitions."

Mexico in Washington

Mexico warrents a high level of interest from the government and private industry, Weil continued. However, promotional events there will be handled from Washington. Five major trade fairs are scheduled for Mexico during fiscal 1980, he said.

"While not as visible as a trade center, professional personnel running the trade shows can be an effective means of getting more U.S. firms, particularly smaller ones, involved in exporting," Weil reasoned.

With the new trade organizations, Weil said the department will have "a flexible capability to go into high potential markets with a high level of resources without the permanent commitment of resources that trade centers have traditionally required."

For instance, the department would be able to contract for a variable number of booths at a local trade show without being constrained by the size of the exhibit space within a particular trade center.

However, one disgruntled department official contended that the new structure would greatly reduce the number of department staff people available for consultations with local businesses.

Half the Budget

The budget for the international marketing program was about $8.8 million this year and is slated at $4.6 million for fiscal 1980, a spokeswoman said.

Besides the trade centers, the Department of Commerce carries out its international marketing activities through six international marketing centers slightly smaller than the trade centers and a variety of smaller trade installations.

Hearings on appropriations for the next fiscal year are currently underway in Congress.

Compec Europe Starting May 8

LONDON — Compec Europe, a small computer and peripherals exhibit, will be held in Brussels beginning May 8.

Requests for exhibition space for the show, now in its fourth year, are up 20% from last year. It is anticipated that more than 150 exhibitors will show their products during the three-day show.

Last year's show drew 6,000 people representing more than 25 countries.

Exhibitors Signed

Exhibitors signed to date include Ampex Corp., California Computer Products, Inc., General Automation, Inc., Facit SA and Hewlett-Packard Co.

In addition, a British joint venture section will represent 25 UK firms.

The show, which will be held at the Centre Rogier, is sponsored by *Computer Weekly* and other publications of International Publishing Corp. (IPC) Business Press.

Further information can be obtained by contacting Compec Europe Tickets, Room 821, Dorset House, Stamford St., London SE1 9LU, England.

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You'll find a lot of configurations in which an 1800 can play an important part in addition to its multiple-user capabilities. It can be a stand-alone processor or participate in a widespread network. The built-in interface makes data communications easy. It can even participate in an Attached Resource Computer™ (ARC™) system.

With 60K bytes of user memory, the 1800 allows fast program execution. Economical double-density diskette data storage can be expanded from the standard one million characters up to four million. A wide range of Datapoint peripherals allows you to tailor a system around an 1800 to exactly fit the tasks at hand.

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Calcomp-Xerox Deal Completed

ANAHEIM, Calif. — Xerox Corp. has completed its acquisition of the Memory Products Division of California Computer Products, Inc.

The former Calcomp division will become Century Data Systems, Inc., a wholly owned subsidiary of Xerox. Century Data Systems, originally formed in 1968, was acquired by Calcomp in 1972, becoming the Memory Products Division, a Xerox spokesman explained.

Xerox and Calcomp signed a definitive agreement for the sale in January. The agreement was subject to a final audit of the assets to be transferred. The purchase price was approximately $25 million.

James Y. Payton will head Century Data Systems. Payton had managed the Calcomp memory operation prior to the acquisition. Warren W. Sullivan is the vice-president of marketing; Richard J. Charlton, vice-president of engineering; and Thomas L. Skelly, vice-president of manufacturing.

The new corporation will become part of Xerox Corp.'s Information Products Group, which includes Diablo Systems, Inc., Versatec, Inc., Shugart Associates and Xerox Business Systems.

NCR Scanning Systems Jump Fourfold in 1978

DAYTON, Ohio — NCR Corp. more than qaudrupled the number of its Universal Product Code (UPC) scanning systems installed in supermarkets during 1978.

At year's end, NCR had installed 224 systems, up from the 50 systems in place at the beginning of the year, according to D.J. McCarthy, vice-president of retail systems for NCR's U.S. Data Processing Group.

"The UPC symbol now appears on more than 80% of the items on the shelves of most supermarkets," McCarthy said, explaining the steep jump in installations.

With more than 65,000 checkout terminals in mass marketing outlets throughout the world, this large user base will spur demand for its UPC scanning systems throughout 1979 and beyond, he predicted.

In fact, NCR's marketing approach had been to install a basic system first, giving supermarkets and other users the option of implementing scanning systems on their own time schedule.

"Many supermarket chains have completed the initial phase of testing and evaluation of the systems and are now making large-scale commitments," McCarthy added.

The systems reportedly pay for themselves in 9 months to three years.

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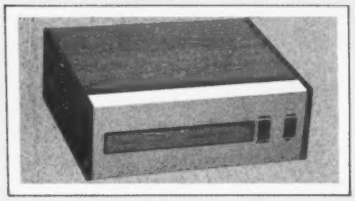

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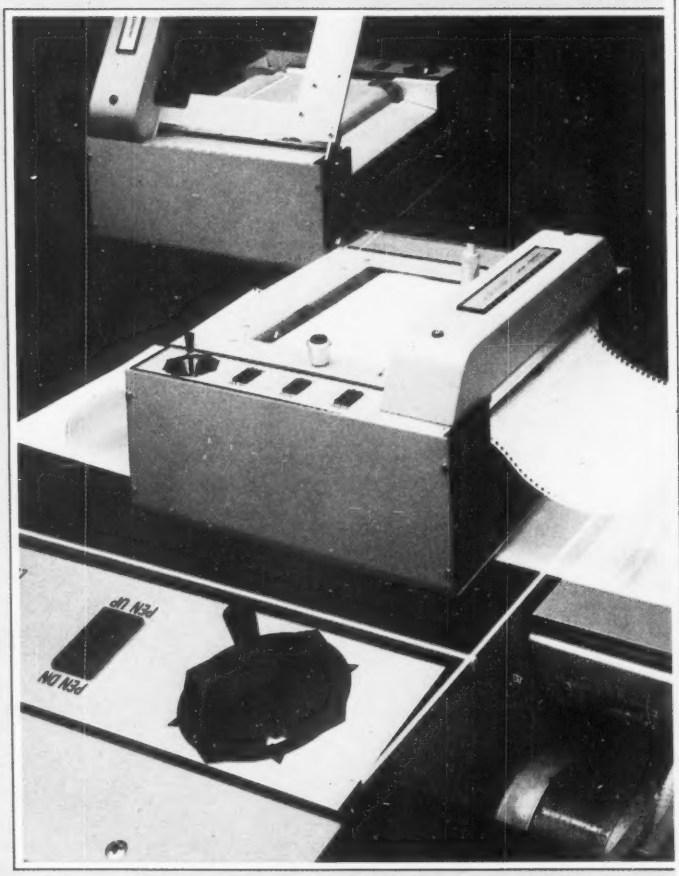

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Nickels & Dimes

Applied Data Research, Inc. has deferred indefinitely the underwriting of an offer for 200,000 shares of its common stock because of current market conditions.

$ $ $

Anacomp, Inc. has agreed to acquire 200,000 shares of **Computer Micrographics, Inc.** (CMI) common stock. The stock is being purchased from two CMI stockholders for about $8 per share. That purchase and an option for another 115,000 shares of CMI represent about a 25% interest of the issued and outstanding stock. Anacomp and CMI are presently holding preliminary discussions on the possible merger of the two firms.

$ $ $

DPF, Inc. has acquired the remaining 4.1% equity interest in **Interstate Brands Corp.** Each of the 95,285 shares of Interstate common stock held by minority shareholders of that company have been converted to 1.3 shares of DPF common. In addition, those stockholders will receive a cash payment of $1.71 for each share of Interstate common.

$ $ $

Intersil, Inc. and **Datel Systems, Inc.** have amended their agreement in principle under which Datel is to be acquired by Intersil. Under the new agreement Intersil will pay $16 million in cash to Datel shareholders instead of the $16.6 million previously announced.

Docutel '78 Earnings Posted in Black Ink

By Marcia Blumenthal
CW Staff

DALLAS — Docutel Corp.'s financial future seems brighter since it recommitted itself to the automated teller machine (ATM) market and acquired an established company in an unrelated industry.

For its last fiscal year ended Dec. 31, Docutel reported earnings of $2.8 million or $1.12 per share compared to a loss of $8.2 million or $3.22 per share for its previous fiscal year. The firm also benefited from an extraordinary credit of $1.2 million or 47 cents per share for fiscal 1978.

Revenues for the year were $33.9 million compared with $25.3 million in the prior year.

An early entrant in the ATM market, Docutel delivered its first ATM in 1970. The company's fortunes soared, with revenues spiraling to $29 million by 1973.

By that time, Docutel had sold 1,600 ATMs to nearly 500 banks, and its stock was trading at $60 a share.

But the recession in 1974-1975 and conflicts in banking regulations, which came to a head in 1976, severely depressed the market for ATMs. During the recessionary period, banks found delaying the decision to acquire an ATM a convenient way to save $30,000, particularly since the machinery offered no tangible benefit to the bank.

Moreover, in 1976 banking regulators in many states were hashing over the issue of whether remote ATMs should be considered bank branches. Because of the uncertainty in banking laws, bankers hestiated to purchase the equipment.

Docutel introduced an ATM in 1976, but it was poorly received.

Aside from these two market developments, competitors began making inroads into Docutel's sizable market share during that three-year period. Competitors such as NCR Corp., IBM, Burroughs Corp. and Diebold entered the market.

In 1974, orders for Docutel ATMs dropped by 25% and only recovered slowly over the next two years, a company spokesman said. The firm suffered an operating loss during 1974, pulled itself back to profitability during the next two years, but sustained another operating loss during 1977.

The market for ATMs began recovering in 1977. The ATM market is expected to quadruple by 1985, with 32,000 ATMs forecast to be installed by that time, according to one market research report.

Hoping to cash in on the reviving market, Docutel introduced its Total Teller 2300 last September. Aimed at its installed Total Teller base of 3,200 units, the new machine allows current users to retrofit their equipment at 40% the cost of acquiring a new machine, the spokesman said.

Egg in Another Basket

While Docutel is counting on the health of the ATM market, past experience has made the company wary of putting all its eggs in one basket.

To diffuse its market vulnerability, Docutel last year acquired the Pine State Knitwear Co., a maker of private label knitwear and sweaters. Previously part of Hanes Corp., the company is considered an industry leader and is solidly profitable. At the time it was acquired, it had sales of $12 million for its current fiscal year.

Docutel's financial results for last year have been consolidated, and the company is unwilling to disclose the breakdown of revenue and income for the two separate portions of the business.

However, at the end of last fiscal year, Docutel reported a backlog of $12 million for its financial systems and a backlog of $5 million for its knitwear.

Financial News

Adds Totals 100,000

HAUPPAUGE, N.Y. — Robert A. Degan, president of Applied Digital Data Systems, Inc. (Adds), congratulates Frank Babina, vice-president and general manager of Technicon T&T Corp. of McFarland, Wis., upon delivery of Adds' 100,000th CRT terminal.

During the presentation, Degan noted it took the company more than eight and a half years to reach its 50,000 terminal delivery plateau, but only another 15 months to achieve the 100,000th milestone.

For its latest fiscal year ended Nov. 30, Adds reported earnings of $6.5 million or $1.23 per share compared with earnings of $5.2 million or $1.01 per share for its previous fiscal year. Revenues for the year topped $46.8 million, up from $33.1 million in the prior year.

Keydata Has 'Planned Loss' Of $573,000 in Quarter

WELLESLEY, Mass. — Keydata Corp. reported that it sustained a "planned operating loss" of $573,000 or 23 cents per share for its second quarter of fiscal 1979, compared with earnings of $67,000 or 2 cents per share for the same quarter a year ago.

"The loss, which had been forecast in the company's most recent annual report, resulted form Keydata's continuing heavy investment in the recently announced Unity series . . . combined with an ongoing high level of investment in developing a new distributed processing product and expenses associated with the expansion of the marketing force," Keydata President L. Edwin Donegan Jr. said.

Donegan projected a return to profitability for the company during the second half of the fiscal year, when the company begins installing Unity systems.

Revenues for the second quarter were $3.7 million, about the same as in the year-ago quarter.

For the first half, the company had a loss of a little more than $1 million or 42 cents per share compared with earnings of $114,000 or 4 cents a share for the same half in the last fiscal year.

Revenues for the six-month period were $7.5 million, slightly more than the $7.4 million in the comparable period a year ago. When the Unity Series was announced last April, Keydata limited its sales to four industry groups. However, as a result of continuing software development, added 12 more industry groups last October thereby expanding its market threefold, Donegan claimed.

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Rockwell Opens Lab

CEDAR RAPIDS, Iowa — To meet LSI and VLSI requirements for advanced electronic interconnect systems, Rockwell International's Interconnect Products operation opened a 4,300 sq-ft research laboratory in its Rockwell-Collins facility here.

The laboratory will analyze the higher speed and density interconnect requirements of LSI and VLSI devices for computer and government electronics projects.

Plans also call for the development of custom multilayer interconnect processes. Currently, the laboratory is working on interconnect systems to be based on boards containing up to 24 separate layers of connecting patterns with lines and spaces down to .006-in. wide.

Part of Rockwell's Electronic Devices Division, Interconnect Products supplies multilayer printed circuit boards for in-house use as well as to outside customers.

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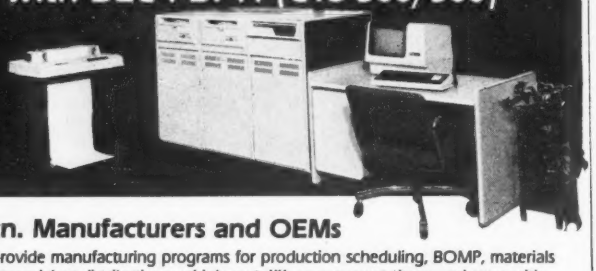

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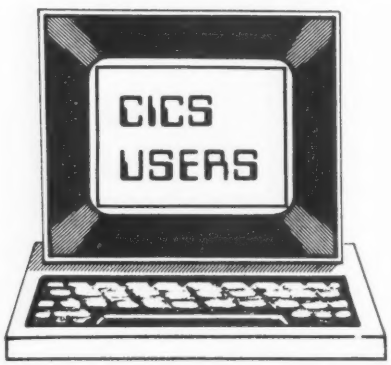

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Division Makes CRTs

Ramtek Buys Omrom Arm

SUNNYVALE, Calif. — Ramtek Corp., manufacturer of computer graphics displays, will pay $1.6 million for the major assets of the Information Products Division of Omron Electronics, Inc.

Omron maintained that the division, which manufactures CRT terminals, had been profitable, but put it up for sale on Oct. 18 as part of a decision to focus marketing and manufacturing efforts on components for the industrial automation market [CW, Nov. 20]. The firm reached an agreement in principle with Ramtek on Feb. 2.

Ramtek acquired certain fixed assets and Omron's installed lease base of about 1,500 units, located primarily in government and state agencies, according to Thomas Adams, the display manufacturer's vice-president of finance. Adams said his company did not buy Omron's receivables or any of its liabilities.

Ramtek made an initial $400,000 payment and will finance the balance with a three-year secured promissory note.

Omron's user-programmable alphanumeric intelligent terminals "round out our computer graphics display product line," Adams explained, noting Ramtek offers graphics systems "that just do alphanumerics" on up to $100,000 imagery displays for computer-aided tomography (CAT) and resource satellite work.

Plans are to merge the Omron operation, currently located in Sunnyvale, Calif., with Ramtek in a new 85,000 sq-ft facility in Santa Clara, Calif. The move is slated for July 1.

Ramtek has hired about 50 of Omron's 125 employees including Richard Nielson, general manager of the Information Products division, who will likely serve as Ramtek's product manager for the new CRT terminal line.

Ramtek plans to sell the terminal products through its own marketing organization, but will maintain most of Omron's network of representatives and distributors, he said.

For the last fiscal year ended March 31, 1978, Omron's Information Products division reported sales of about $5.4 million. Ramtek had revenues of $15 million for fiscal year ended June 30, 1978.

Electronics Associations Rally Against Export Act

(Continued from Page 81)

ity. According to the Commerce Department, export license applications are currently being filed at a rate of 77,000 cases per year.

A recent General Accounting Office report recommended centralizing export control in the Commerce Department [CW, Dec. 4]. Presently, any one of several departments and agencies, including the State Department, the Defense Department and the National Security Council, can review and deny export license applications.

"It is important that the departments involved in export administration not have veto power over each other, but should operate on a majority rule basis, with the minority having right of appeal to the next highest level until a decision is made, if necessary by the President," McCloskey said.

Moreover, the types of equipment requiring export approval should be limited to technologies not available from other countries. "Demonstrated availability from any foreign source should constitute a presumption in favor of license application approval," McClosky argued.

Export licenses should not be used as a tool of U.S. foreign policy. Such practices are not effective, the witnesses claimed. They only force buyers to turn to competitors of U.S. companies and add to the general unreliability of American firms as suppliers.

Subcommittee Chairman Sen. Adlai E. Stevenson III (D-Ill.) was generally sympathetic to the viewpoint expressed by the industry representatives and indicated that legislation he will soon introduce to amend the Export Administration Act will incorporate many of the revisions for which they asked.

In the House of Representatives, a bill introduced by Rep. Jonathon B. Bingham (D-N.Y.) would promulgate essentially the same revisions. In introducing the legislation March 1, Bingham called the present export approval systems "a morass" that does little more than lose business for American firms.

Supershorts

Citing a growing export market, MDB Systems, Inc. named 12 overseas distributors for I/O peripheral device controllers and modules, systems modules and communications modules. Exclusive distributors are Micro-Automation for Austria; Anderson Digital for Australia and New Zealand; Yrel for France; Decisions Systems in the Philippines; Datacare B.V. in The Netherlands; Adcomp AG for Switzerland and Lichtenstein; Radiel SPA in Italy; Stemmer Elektronik in West Germany; Sapphire Innovators for India; Transduction Ltd. in Canada; and ASR International Corp. for Japan. Also, Tel-Inter AB was named nonexclusive distributor in Sweden, Norway and Finland.

— — —

Under an agreement with Argentina, ITT World Communications, Inc. will provide its Universal Data Transfer Service (UDTS) between Argentina and the U.S. UDTS provides international access to data bases and time-sharing services, including the U.S. government's National Library of Medicine and Lockheed's Dialog.

Gives Seminar on Environmental Applications

Software Supplier Lends Expertise to Chinese

By Marcy Rosenberg
CW Staff

PEKING, China — Applying computer technology to geographic and environmental assessment was the topic of a recent seminar here paid for by the People's Republic of China and presented by Environmental Systems Research Institute (Esri) of Redlands, Calif.

Esri has developed computer-based geographic information systems for domestic applications and for a number of other countries including developing nations such as Libya, Indonesia, Thailand and Saudi Arabia.

Because the Chinese government also was interested in becoming "more advanced" in the area of geographic planning, the Academy of Sciences here invited Esri to teach scientists and programmers at the academy's Geographic Institute how to use computers for environmental impact assessments, according to Jack Dangermond, Esri director, who conducted the seminar.

Current plans call for Esri to sell its software package to the Geographic Institute. "We will begin to implement three computer mapping programs there in about two months, as well as start a training program for institute personnel both on-site and at our California office," Dangermond said.

Potential applications in China could include selecting optimum sites for new towns, new industrial locations for steel plants, agricultural development, hydroelectric projects and an irrigation project to run from the Yangtze River to the Northern Province, he indicated.

Esri's geographic information system converts to machine-readable, or digital, from various maps — representing such regional geographic data as land use, soil and geology — for input into a computer.

The maps are then overlaid and synthesized to output combination maps that help interpret or predict the most suitable sites for anything from new housing developments to railroads.

Depending on the application, this "machine-independent" system requires a basic hardware configuration consisting of a 34K- to 64K-byte CPU, disk drive with at least a 40M-byte storage capacity, a line printer and an X-Y digitizer.

Interested in Hardware

While the Geographic Institute's present hardware capabilities meet these minimum requirements, the academy has asked Esri — which supplies software and training only — to collect materials on currently available U.S.-manufactured computer graphics equipment including digitizers, plotters, color film recorders and CRTs.

The People's Republic of China "has not always had access to commercial information on hardware manufactured in the U.S.," according to Dangermond, who noted that China has about 2,000 computers -- acquired primarily through foreign agents — compared to "150 times that number in the U.S."

Developing countries like India, Pakistan and China "are hard-pressed to have any equipment at all" because of economic constraints, he added. "One of China's biggest problems is that it is a very poor country."

Because of the economic situation, Dangermond disagrees with those in the industry who view China as a potentially large market for computer equipment. "Computers will have some applications in specialized areas such as oil and heavy industry, but you won't see the kind of prolific use we have here — at least not right now."

From his firm's experience with the Geographic Institute, Dangermond said the lack of money and resources force China "to be careful about what it buys. No one person makes a decision. Everything is done by committees and only after a lot of evaluation and discussion."

Same Problems

About potential difficulties in implementing computer-based systems in China, Dangermond foresees only "the same problems as in other foreign countries — cultural and language differences."

Asked if Esri's China seminar, involving 10 hour-per-day lectures from Feb. 12-Feb. 21, would have been possible had the U.S. not recognized the country, he noted "our interaction with the academy started before normalization of relations was finalized."

Dangermond does not expect U.S. export controls to impede Esri from implementing the geographic information system in China because what the company is supplying "does not involve hardware nor is it high-technology relative to, say, nuclear physics."

Mini Makers Pitching to China

(Continued from Page 81)

organization here that organizes foreign trade missions for U.S. businessmen, discovered from its research that China was interested in minicomputers and sent a proposal to the Chinese government.

According to Mardigian, China's need for minicomputers centers around several government development projects. These include plans to double the output of the steel industry, develop oil resources for domestic use and export and improve agricultural development.

In addition, a major project to improve the quality of education and add more educational institutions will require computer technology for such applications as keeping track of materials and staffing schools, she added.

Since China usually deals with foreign companies on an individual basis, Mardigian said the government was "enthusiastic" about the proposal to speak to a group of manufacturers in one product area.

It took eight months, however, to receive an invitation. The Chinese government had to evaluate the proposal and its relevance to the country's overall development plan, she explained.

Some Vendors Declined

Once the mission was approved, California Trade Delegations contacted some 30 to 40 U.S. manufacturers. Mardigian would not reveal the firms which declined to participate, but noted "a few already had an entree into China and most weren't at an export level to consider China a feasible market."

Participating companies did not need U.S. government approval to join the trade mission, but they will have to apply to the Commerce Department for an export license to sell equipment to China.

In Peking, members of the mission will conduct product seminars before the Chinese Electronics Society, a consulting agency that screens technical products for the China National Instruments Import and Export Corp. — also known as Instrimpex — which is the government agency responsible for purchasing electronic equipment.

Instrimpex is one of a network of trade corporations controlled by the Ministry of Foreign Trade to conduct China's international business activities.

Mardigian expects the current trade mission, slated to return to the U.S. on March 29, to be the first of many her firm will organize to China.

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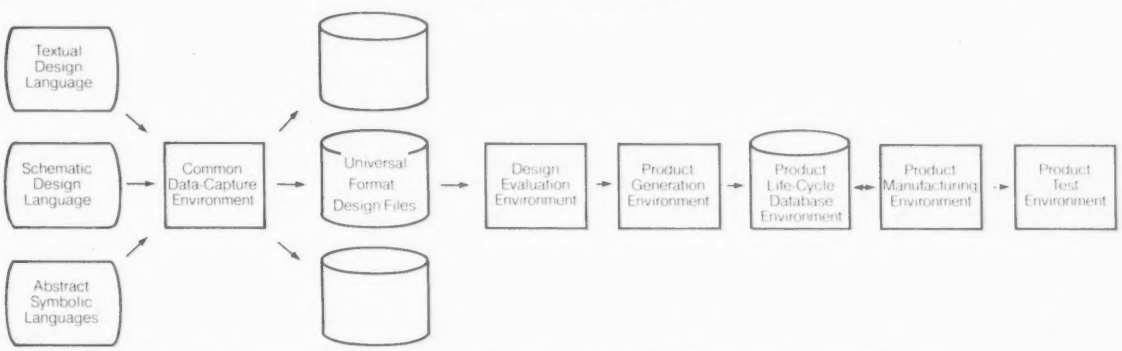

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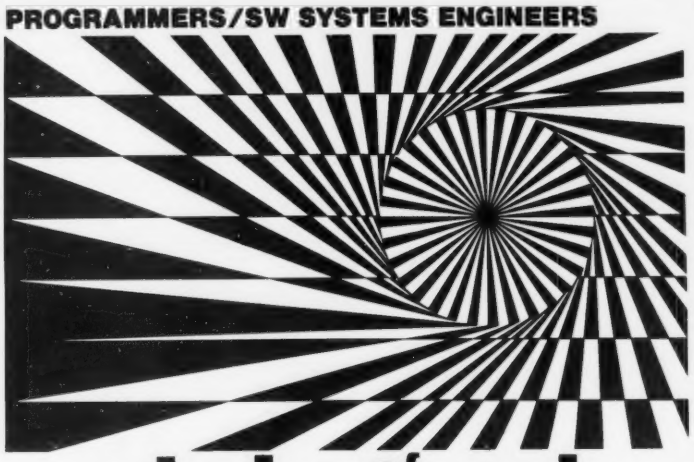

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We are a prestigious, Southeaster, Fortune 500 Company seeking an experienced Computer Systems Analyst and a Teleprocessing Systems Operator to assume the duties and responsibilities of a Lead Programmer Analyst. The persons we select will have a minimum of five (5) years experience working directly with users in designing, programming and implementing computer based systems. Emphasis on systems inter-face with manufacturing oriented user departments, or experience with on-line teleprocessing computer systems such as BTAM or CICS. Must be knowledgeable with ISAM, VSAM, Assembler, COBOL, data-base management concepts and 360/370 teleprocessing systems network.

We are also seeking an experienced Operating Systems Programmer to assume the duties and responsibilities of Lead Technical Programmer. The person we select will have a minimum of five (5) years experience working with DOS/DOS/VS internals with spooling monitor such as POWER or GRASP. Must have technical aptitude in areas such as: multiprogramming, remote job entry, job control language, data-base management, teleprocessing, assembler, COBOL, RPG, FORTRAN. Experience with OS systems would be helpful.

These positions report directly to Manager of Programming Systems. College degree preferred, special education and related experience considered.

Qualified and interested persons please send a resume including salary history to:

Personnel Manager
or Call: 615-361-2078
to discuss qualifications for the positions.

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P.O. Box 210 Nashville, TN 37202

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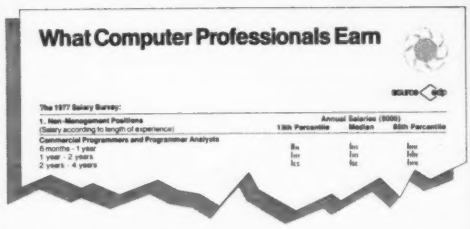

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SYSTEMS ANALYSTS

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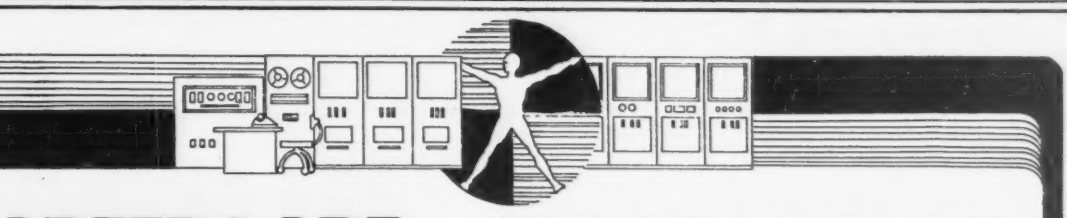
SYSTEMS ANALYST

Touro Infirmary, a 570-bed teaching institution located in the charming City of New Orleans, is currently seeking qualified individuals to fill the following two positions:

Senior Systems Analyst
- Minimum of 5-7 years experience
- Experience working with DOS/VS, CICS and knowledge of COBOL and Assembly languages.

Systems Analyst
- Experience working with DOS/VS, CICS and knowledge of COBOL and Assembly Languages.

Touro offers a salary commensurate with experience, an attractive benefit package including tuition reimbursement and paid relocation. Call collect or send resume to: **Jill M. Ireland, Employment Manager, Touro Infirmary, 1401 Foucher Street, New Orleans, Louisiana 70115, (504) 897-8408.**



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To foster this most important asset, OSI has provided a dynamic working environment that offers an atmosphere of personal challenge and growth opportunities for everyone by developing or procuring a variety of applications programs in the areas of:

- Construction Manufacturing Systems
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The services that OSI provides its clients from the main centers in Santa Clara, California and Rockville, Maryland on large scale IBM equipment under OS/MVS and a nationwide network of branch offices has helped OSI grow to a leader in the Data Services area.

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Positions are available in major Metropolitan areas for:

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Opportunitels are available involving many diverse activities, some of which include designing and coding structured COBOL programs, walkthroughs, testing and systems analysis. Experience required:

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The ideal applicant should have minimum 2 yrs experience operating large-sclae 370 machines. Should have MVS/JES2, OS/JCL experience. Must be totally familiar with all associated peripheral equipment. Operate and control systems under minimum supervision, analyze potential problems and take corrective action, provide technical direction to operators.

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- **Fred Moore ext. 6087**
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STC

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Data Processing

software systems support

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Minimum 1 year IBM systems programming experience in an MVS environment. Knowledge of utilities required. Knowledge of JES-3 desirable.

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H - 6080

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PROGRAMMERS

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Responsibilities include functional design and implementation of application related to the control of communications devices. This software will perform switching and controlling of communications network systems.

Applications Programmers -
Should have a minimum of 2 years real-time assembly language experience in mini-computers or microprocessors, communications, teleprocessing, remote batch, IBM 3270/2260, Uniscope 100/200/400, VIP 7700 exposure helpful.

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Management Information Systems

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Must be experienced in implementing and maintaining Univac 1100 series operating systems. Responsible for implementing, enhancing, and maintaining DMS 1100, COBOL, QLP and other related software on a large Univac 1100 with multiple applications.

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Individual should have 3-5 years systems analysis and programming experience with business applications utilizing ANS/COBOL. Experience in Univac 1100 series and degree preferred.

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Duties include analysis design and development of data bases for both batch and on-line applications utilizing DMS 1100 data base management systems. You will also be responsible for training, consultation, performance measurements and optimization of data base designs.

Send your resume in complete confidence to Rod Manning c/o:

Racal-Milgo, Inc.

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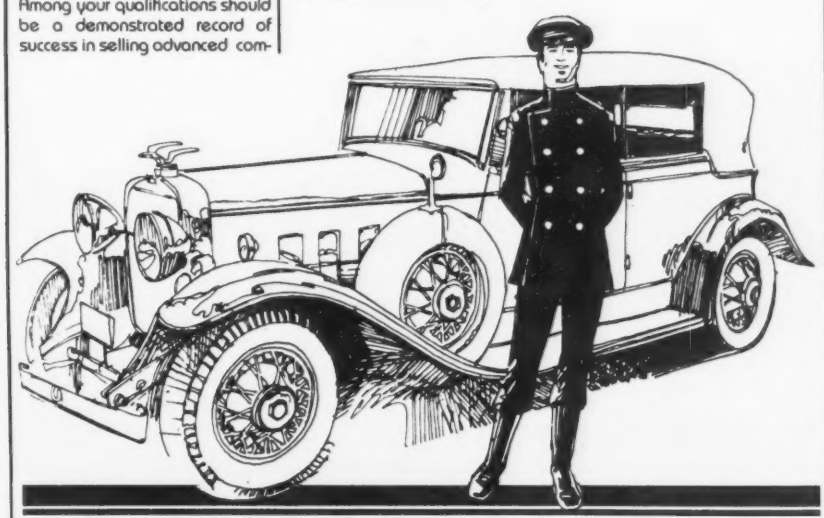

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- **2-3 years programming experience**
- **Working knowledge of ASSEMBLER**
- **Knowledge of high level language**
- **Hewlett Packard Series 3000 experience desirable.**

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  — time-sharing — compiler designs/developments (high-level block structured languages) — SW tools design
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Mr. George Rice, Manager, Professional Placement, Engineering and Manufacturing, Dept. P 50, NCR Corporation, 16550 W. Bernardo Drive, San Diego, California 92127.

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Department of Psychiatry & Behavioral Science
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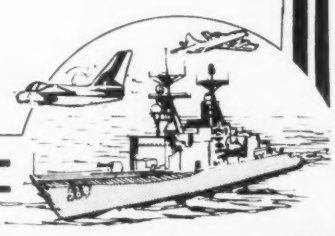

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Computers

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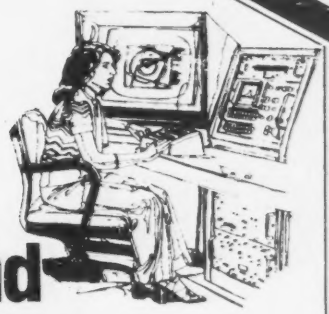

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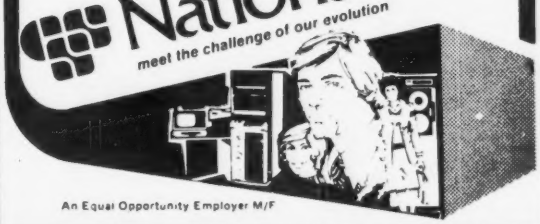

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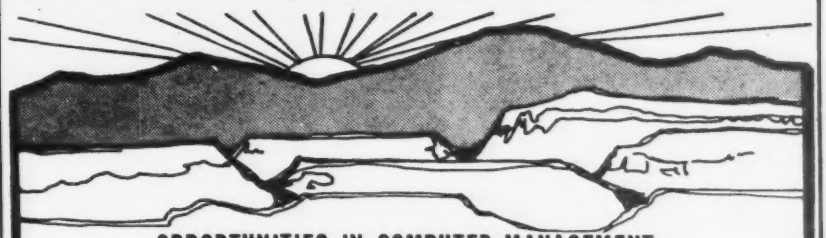

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* Implement all changes in the CCF.
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* Interact continually with CCF users throughout the Laboratory and with other C-Division staff.

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* BS, MS, or PhD in computer science (or related technical field) or suitable combination of relevant education and experience.
* Ability to communicate and interact well with widely disparate groups of people.
* Several years' successful management of a large scientific computing facility is desired; comparable management experience is acceptable.
* Background in scientific computing applications, FORTRAN programming, and systems programming is desirable.

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RESPONSIBILITIES:

* Provide technical direction for group projects, including operating system maintenance, enhancement, and development for the large scale computer systems in the CCF.
* Provide other CCF user services.
* Assist with administration of group activities.

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* B.S. or advanced degree in computer science, mathematics, physics, or related scientific field, or suitable combination of relevant education and experience.
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* Minimum 1 year's experience with 1 or more of the large scale computers in the CCF.
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DIV-79-Y
Los Alamos Scientific Laboratory
P.O. Box 1663
Los Alamos, New Mexico 87545

University of California

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PROGRAMMERS

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UHCP

Equal Opportunity Employer M/F/H

White Mountain Area of New Hampshire

Plymouth State College has an immediate opening for an individual who will be responsible for supporting all data management system activity for administrative users on a PDP-11.

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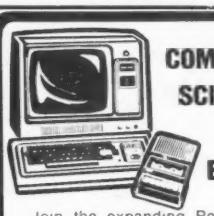

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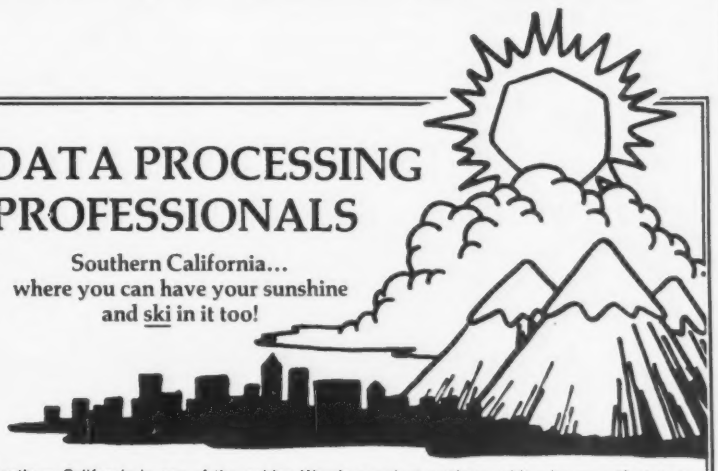

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Assistant Director
Systems & Programming

Major New England Life Insurance company has a challenging career opportunity in our dynamic and expanding Data Processing department.

This position requires the talents of a results-oriented professional with proven managerial abilities. Must be able to assume immediate responsibility for the development and implementation of a company-wide computer based systems; motivate a staff of 25 managers, programmers, and technicians; and communicate effectively with users. Strong background in project management required. Working knowledge of on-line systems, COBOL and BAL preferred. Previous insurance industry experience a plus. Our system includes an IBM 370 computer operating under DOS/VS in an expanding on-line environment.

We offer a competitive salary, comprehensive employee benefits program, plus excellent working and living conditions at our central location in the progressive state capital of New Hampshire — only 90 minutes from Boston and 45 minutes from the scenic White Mountains.

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Mr. Karl Steiner, Employment Manager

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CONCORD NEW HAMPSHIRE
A Chubb Corporation Company

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Los Altos, Ca. 94022
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610 S.W. Alder, Ste 711
Portland, Ore. 97205
(503) 224-6860
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IBM 3033 Proj. Ldrs	$34K

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Data Processing Division
Key Executive Employment
P.O. Box 1746, 321 Colton Bldg.
Toledo, OH 43603 (419) 241-6201

Computer Professionals

L'EGGS PRODUCTS, a division of Hanes Corporation and the world's number one manufacturer of womens hosiery has two outstanding data processing opportunities. L'EGGS has relied heavily on EDP to meet the needs of its sophisticated operation since its beginning in 1970; and to meet the continuously growing demand for DP support these additional positions have been added to our staff. Each opening requires a degree preferably in Computer Science and DP experience in a business environment utilizing large scale equipment (Honeywell 6000, or 6600, IBM 370, etc.) and strong written/verbal communications skills.

SYSTEMS PROJECT MANAGER

This position will be located in our Atlanta Data Center. Candidate should have a minimum of 7 years in EDP, at least 3 of which should be as a Systems Analyst or higher, and the following:

- Responsibility for completion of major DP projects.
- Project Planning and reporting exposure.
- Proficiency in COBOL language.
- Supervisory responsibility.
- Broad exposure in distribution related systems.

Responsibilities will be overall management of systems projects from conceptualization to final implementation including development and documentation of conceptual design, supervision of detail design and liaision with user departments.

SYSTEMS ANALYST

This opening in Winston Salem, North Carolina, requires a minimum of 4 years total DP experience, 2 years of which should be a Systems Analyst plus:

- Strong FORTRAN background.
- Support of Inventory control.
- Heavy exposure to interactive applications.

Candidates must be capable of preparing detailed systems design and documentation with minimum supervision and be willing to code and test programs if necessary to meet deadlines.

If your background matches the requirements for either of these positions and you desire to join an aggressive industry leader, then send resume including salary history in STRICT CONFIDENCE to:

Recruiting Coordinator
L'EGGS PRODUCTS
P.O. Box 2495, Winston-Salem, North Carolina 27102
Affirmative Action Employer

Data Processing

Agribusiness Cooperative, well established in the Food Processing Industry with sales in excess of $256 million and multi-plant operations in the San Joaquin Valley has an opening in its Information Systems Dept. located in San Francisco for:

analyst programmer

We are currently expanding into transaction processing and distributed DP using DEC PDP-11 Mini Computers. Successful applicant must be user and applications oriented with 3-4 years experience; must have good problem solving and communication skills and be a competent COBOL programmer. Applicant should have a college degree; experience in manufacturing or distribution preferred.

Local Interviews Can Be Arranged

Please send resume, including salary history to Rodger Faulkner, TRI/VALLEY GROWERS, 100 California St., San Francisco, CA 94106 or call (415) 445-1663. An equal opportunity employer M/F.

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Sys. Assur. An'l. RPG II, analysis & audit exp.	to $19,500
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Dig out that old resume and call J. Lefkowitz collect at (305) 891-4801. Corporate Advisors, Inc., 12955 Biscayne Blvd., Miami, Fla. 33181

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Progressive, Innovative SF Bay Area based EDP center seeks personable, self-motivated individual with previous programming mgmt. exp. Key duties include managing implementation of large Savings and Loan On-Line computer system. This system will utilize Data Base and Data Communication with structured development techniques. Financial or Mortgage Banking background a plus. Great growth opportunity for right individual. We offer excellent benefits and salary as well as the opportunity to grow with an industry leader. Send resume with salary history to: **Bob Liscano, or call (415) 772-1481.**

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CITIZENS SAVINGS
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PROGRAMMER/ ANALYST

Immediate opening for a programmer/analyst who desires a challenge and professional growth opportunities. Applicants must have through knowledge of programming concepts and techniques, debugging ability, and knowledge of COBOL and RPG. Applicants with professional experience in financial, statistical and payroll/personnel will be given special consideration. We operate with Burroughs B-1700 hardware and TD831CRT entry. We are a comprehensive community health center located in Southwest Indiana. We offer excellent fringe benefits and advancement potential. Please submit resume and salary requirements to:

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PROGRAMMING PROFESSIONALS

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IBM S/34 Programmer/Analyst

Manufacturing/Construction Company located in the Northwest Chicago Suburbs has a new position available due to expansion. We are seeking an individual with S/34 experience — direct file and on-line experience highly desirable. Our emphasis is on **TECHNICAL EXPERTISE** for which we offer excellent compensation. Presently we have a S/34 with 128K, 128 MB and a S/38 scheduled for early 1980. Excellent working conditions, relocation allowance, reasonable hours, fringe benefit program and growth potential. If you are up on the state-of-the-art and have a good work history, please send resume and salary requirements.

The
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Mr. J. VanNess
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EDP OPPORTUNITIES

RETAIL SYSTEMS ANALYST

Duties include feasibility studies, definition of user requirements, development of programming specifications, documentation of systems and procedures, and responsibility for guiding systems development and implementation activities. Good oral and written communication skills and a sound technical data processing background are essential. 3-5 years' direct experience with retail applications on IBM 370 required.

COMPUTER PROGRAMMER

Duties include the implementation of new systems from the design phase through coding, testing, and documentation as well as maintenance of existing systems. 2-3 years' of direct COBOL programming experience on IBM 370. Familiarity with standard business systems and ability to work with user department is required.

We offer attractive benefits including paid vacation, hospitalization, sick leave and life insurance at nominal cost.

Send resumes, in confidence, to King's Department Stores Incorporated, 150 California Street, Newton, Mass. 02158. Attention: EDP Personnel.

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Current needs include a DBA Analyst with three years experience in systems development and one year DBA with exposure to data base design and organization, including on-line and batch systems.

Hardware consists of 370/168 and 158, operating under MVS

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We offer a competitive salary with an excellent opportunity for technical growth and in-depth education.

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Employment Department
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Data Base Design (Architect) mini	TO $25K
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Systems Support-370-168 + 3033	TO $28K
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Mini Computer Sales	TO $25K+Pkg.
Systems Engr/Support * (mini)	TO $23K
Project Coordinator (start-up)	TO $23K
Mfg. Consulting	TO $35K
P/AEducation Coordinator	TO $25K

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47 Perimeter Center East, N.E.
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Contra Costa County,

located near San Francisco is seeking experienced systems programmers for software development and maintenance.

Present environment is IBM 370/OS, ANS COBOL, Distributed Processing, Structured Design, Data Base, Teleprocessing and other leading edge software. Send resume to David Nitchman, Assistant Data Processing Manager, Contra Costa County, Finance Bldg, Martinez, CA 94553, Telephone 415-372-2377, M-F 8-5

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Computer Professionals needed at all levels. Client companies assume all fees. Send resume, desired salary, and location preference to:

datasearch
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Scranton, Pa. 18503
(717) 346-2233

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Highly visible MIS department seeks a skilled data processing professional possessing 4-5 years of solid MRP design and programming experience.

Position offers high challenge in a 370-145, DOS-VS TOTAL-8, ENVIRON-1 environment.

Primary responsibility will be to provide manufacturing systems support in a $50 million, 50-year-old manufacturing company of capital goods and health care products used in hospitals worldwide.

We can offer competitive compensation including substantial incentives, a professional and comfortable working environment, highly attractive living and recreational opportunities in Southeast Indiana, far away (but not too far away) from the maddening crowds.

Interested candidates should forward a summary of their qualifications to:

Mr. Ted Hartshorn
Director of MIS
Hill-Rom Company, Inc.
Batesville, Indiana 47006

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PROGRAMMER/ ANALYST

Progressive, large system environment; MVS/TSO experience required. Must be proficient in COBOL and BAL with a good working knowledge of OS/VS JCL and system utilities. Minimum of six months practical experience. Degree required and MBA desirable. Salary range $15 to $17,000 depending on quality of experience.

Send resume to:

Gary Batterton
Job Service of Iowa
150 Des Moines St.
Des Moines, IA 50316
Phone 515-281-8526

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Programmer analyst with experience in direct mail fund raising software development. Full or part time. **Call Ruth Belanger 471-9222 for appointment.**

COBOL PROGRAMMERS & ANALYSTS

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Programmers who thrive on the latest systems will find Telex exciting. You'll work on a number of programs and the scope of your responsibility will be broad. It won't be easy to become bored, dead-ended or overlooked at Telex. We require a minimum of 2 years COBOL in the above areas and one year DOS or DOS/VS. Mark IV, OS/VS 1, RJE and DBOMP experience desirable.

You'll like seeing the "greener grass" in Tulsa. Clean air, people who smile instead of snarl, escape from crowding & constant pressure. Living costs compare favorably in Tulsa, and you'll have many options in culture, recreation and education. Salary competitive, comprehensive benefits include medical, life insurance, retirement, tuition and relocation assistance. We're choosy ... If we make you an offer, you're likely to be with Telex many happy, productive years. Send detailed letter and/or resume and salary history to Director, Data Processing.

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programmers

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SYSTEMS ENGINEERS

We seek Systems Programmers with a minimum of 1-2 years' internals experience working with MVS or VM. Additional exposure to subsystems or access methods is desirable, preferably JES2, JES3, or VTAM. As a Systems Engineer you will be the Amdahl interface to 470 System customers in all software related functions including:

- **Systems Support**
- **Problem Determination/Troubleshooting**
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Your technical experience includes the ability to read dumps and write code to resolve system problems. Options for future hardware cross-training are available. We currently have immediate opportunities in the following areas:

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San Francisco, CA	Minneapolis, MN	Richmond, VA
	St. Louis, MO	Washington, DC

Qualified candidates are invited to call collect or write the appropriate Regional Recruiting Manager listed below.

Phil Beckhelm	Bob Fields	Buddy Taylor
Amdahl Corp.	Amdahl Corp.	Amdahl Corp.
1250 East	Oak Brook	5454 Wisconsin
Arques Avenue	Regency Towers	Avenue
Sunnyvale, CA	1415 West	Washington, DC
94086	22nd Street	20015
408/746-6165	Oak Brook, IL	301/657-8200
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Personnel Department
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- MVS SYSTEMS GENERATION
- JES2 AND OR JES3
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- VTAM, TCAM OR BTAM
- IMS DB/DC INTERNALS
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- IBM 3705 EP/NCP/SNA
- NETWORK DESIGN

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- MVS COBOL
- IMS DB/DC OR
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PROGRAMMER ANALYST

To assist managers in the solution of financial, statistical and other managment problems through the use of data processing applications. Formulate statements of those problems and devise data processing solutions. Prepare block diagrams illustrating the solutions; analyze existing system and program logic and make revisions. Assist in scheduling and assigning personnel. Prefer college education and substantial Cobol programming experience. Apply to: Assistant Personnel Director

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Data Processing

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Responsibilities include: analysis of various communications processing environments; development of new and/or alternative systems using Bell products as integral parts of the solution. Solid communications skills are necessary to establish effective working relationships with technically oriented customers and our own marketing team.

Qualified candidates should have a degree, computer science or math preferred, and be experienced in the design, implementation and maintenance of data communications software and hardware. Graduate degree is preferred. Understanding of BTAM, TCAM & VTAM, IBM T.P. software/hardware and SNA specifics is required.

This career opportunity offers a competitive starting salary (to $30K), excellent benefits including potential bonus capability, relocation assistance if applicable and a chance to gain professional satisfaction as a member of our industry leading team. For immediate consideration, please send your resume to:

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700 South Flower St., Rm. 1514
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For immediate consideration, please send your resume to Joyce Cordi, Intel Corporation, Dept. 13AC, P.O. Box 3078, Santa Clara, CA 95051. An equal opportunity employer m/f/h.

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To arrange an interview, please contact Raymond Henry at (901) 345-3544. Call collect or send your resume, in complete confidence, to Director of Marketing, MCD.

DATA COMMUNICATIONS CORPORATION

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SYSTEMS/ANALYSTS PROGRAMMER/ANALYSTS

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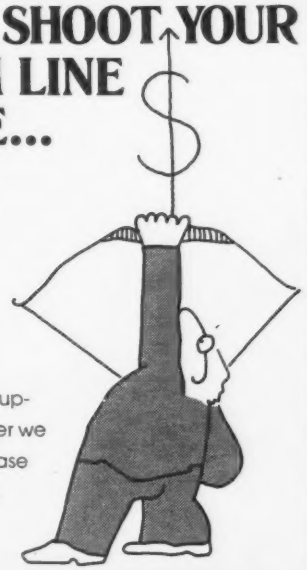

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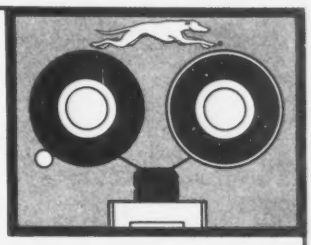

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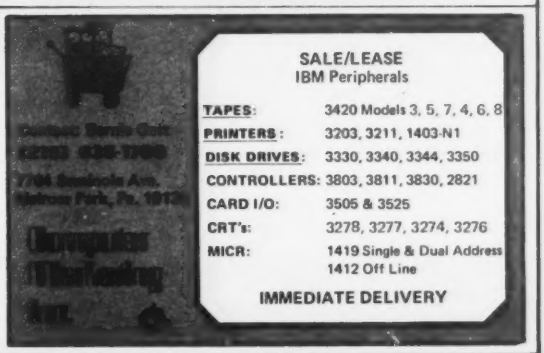

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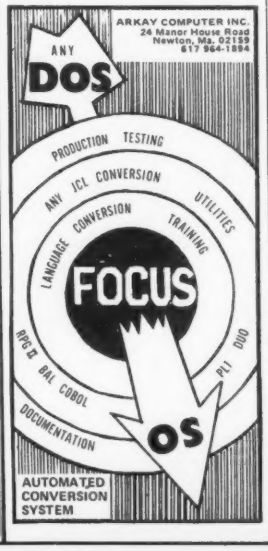

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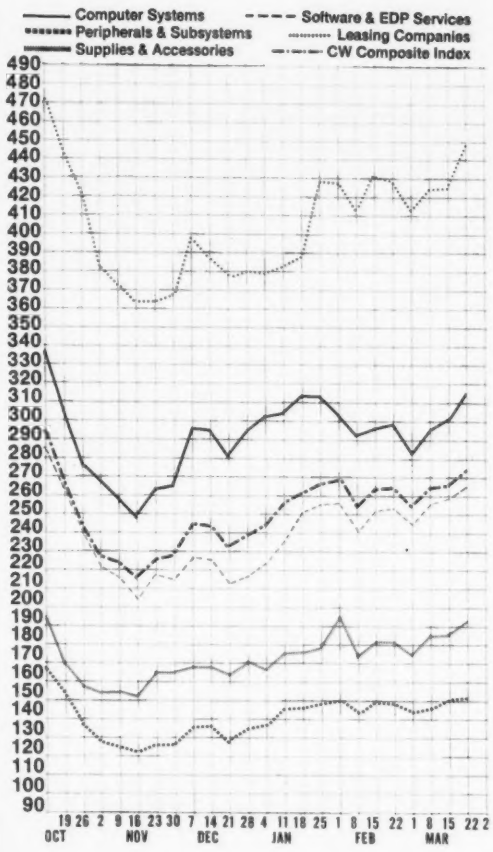

Earnings Reports

ANALOG DEVICES
Three Months Ended Jan. 27

	1979	1978
Shr Ernd	$.61	a$.39
Revenue	21,557,000	14,100,000
Earnings	1,495,000	926,000

a-Adjusted to reflect 15% stock dividend in March 1978.

APPLIED DIGITAL DATA
Year Ended Nov. 30

	1978	1977
Shr Ernd	$1.23	$1.01
Revenue	45,887,625	33,150,025
Earnings	6,553,225	5,255,251
3 Mo Shr	.30	.27
Revenue	14,277,896	10,529,376
Earnings	1,566,037	1,417,296

COMPUSERVE
Year Ended Dec. 29

	1978	1977
Shr Ernd	$.81	$1.10
Revenue	15,835,214	14,331,682
Earnings	914,074	1,254,194
4 Mo Shr	.37	.38
Revenue	5,248,375	4,569,589
Earnings	419,229	416,751

DATATAB
Year Ended Dec. 31

	1978	1977
Shr Ernd	$.18	---
Revenue	6,476,968	$6,160,785
Earnings	127,545	(394,088)

DOCUTEL
Year Ended Dec. 31

	1978	1977
Shr Ernd	$1.12	---
Revenue	33,953,000	$25,315,000
Tax Cred	1,205,000	---
Earnings	2,876,000	(8,256,000)

LEVIN COMPUTER
Year Ended Nov. 30

	1978	1977
Shr Ernd	$.26	$.27
Revenue	3,056,863	2,837,207
Earnings	271,564	260,416

a-Restated to reflect change in accounting for leases.

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TRADE*QUOTES

Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, MARCH 21, 1979

All statistics compiled, computed and formatted by TRADE QUOTES, INC. Cambridge, Mass. 02139

EXCH		1978-79 RANGE (1)	CLOSE MAR 21 1979	WEEK NET CHNGE	WEEK PCT CHNGE
	CO	28- 69	38 3/4	+ 3/4	+1.9
A	AMDAHL CORP	59- 87	69 1/2	+1 7/8	+2.7
N	BURROUGHS CORP	15- 44	23 1/4	+2 1/2	+12.0
O	COMPUTER AUTOMATION	23- 44	33 1/2	+1 1/4	+3.8
N	CONTROL DATA CORP	8- 33	25 1/2	0	0.0
O	CRAY RESEARCH INC	42- 71	64 1/2	+ 1/4	+0.3
N	DATA GENERAL CORP	34- 80	80 1/4	+2	+2.5
N	DATAPOINT CORP	39- 58	53 1/2	+2 1/4	+4.3
N	DIGITAL EQUIPMENT	2- 13	6 7/8	+ 1/8	+1.8
N	ELECTRONIC ASSOC.	9- 19	11 1/2	- 1/4	-2.1
A	ELECTRONIC ENGINEER.	19- 46	33 1/2	+ 3/4	+2.2
N	FOUR-PHASE SYSTEMS	28- 40	32 1/4	+ 1/2	+1.5
N	FOXBORO	7- 26	14 1/2	0	0.0
O	GENERAL AUTOMATION	1- 3	2	+ 1/4	+14.2
O	GRI COMPUTER CORP	62- 95	92	+1 5/8	+1.7
N	HEWLETT-PACKARD CO	43- 76	65 3/8	+1 1/4	+1.9
N	HONEYWELL INC	236-316	316	+8 1/2	+2.7
N	IBM	9- 29	22 1/2	+1	+4.6
O	MANAGEMENT ASSIST	9- 23	21 1/8	+1 7/8	+9.7
O	MANUFACTURING DATA S	10- 23	22 3/8	+2	+9.8
O	MICRODATA CORP	4- 8	4 3/4	0	0.0
O	MINI-COMPUTER SYST	7- 18	16 1/2	+ 3/8	+2.3
C	MODULAR COMPUTER SYS	37- 70	67 1/2	+1 3/8	+2.0
N	NCR	20- 43	31 1/8	- 3/4	-2.3
N	PRIME COMPUTER INC	17- 31	31 1/4	+ 3/4	+2.4
N	PERKIN-ELMER	33- 49	47 1/4	+ 3/8	+0.7
N	SPERRY RAND	11- 24	15 1/4	+ 1/4	+1.6
A	SYSTEMS ENG. LABS	13- 37	26 3/4	+1	+3.8
O	TANDEM COMPUTERS INC	12- 36	36 3/8	+ 5/8	+1.7
A	WANG LABS.	12- 36	35 3/4	+1 1/4	+3.6
	LEA	13- 21	18	- 1/2	-2.7
C	BOOTHE COURIER CORP	5- 27	26 1/4	+2 1/4	+9.3
O	COMDISCO INC	1- 1	1/4	0	0.0
A	COMMERCE GROUP CORP	1- 7	3 7/8	+ 7/8	+29.1
A	COMPUTER INVSTRS GRP	5- 15	8 1/4	0	0.0
C	CONTINENTAL INFO SYS	1- 3	3	+ 1/4	+9.0
M	DATRONIC RENTAL	3- 5	4	- 1/8	-3.0
A	DCL INC	8- 14	11 5/8	+ 5/8	+5.6
N	DPF INC	16- 36	21 7/8	+1 1/4	+6.0
N	ITEL	24- 41	39 1/2	+ 5/8	+1.6
N	LEASCO CORP	1- 4	2 1/4	0	0.0
O	LEASPAC CORP	3- 7	3 1/2	+ 3/8	+12.0
A	PIONEER TEK CORP	13- 20	14 7/8	+ 1/2	+3.4
N	U.S. LEASING	13- 20	14 3/8	+ 3/8	+2.6

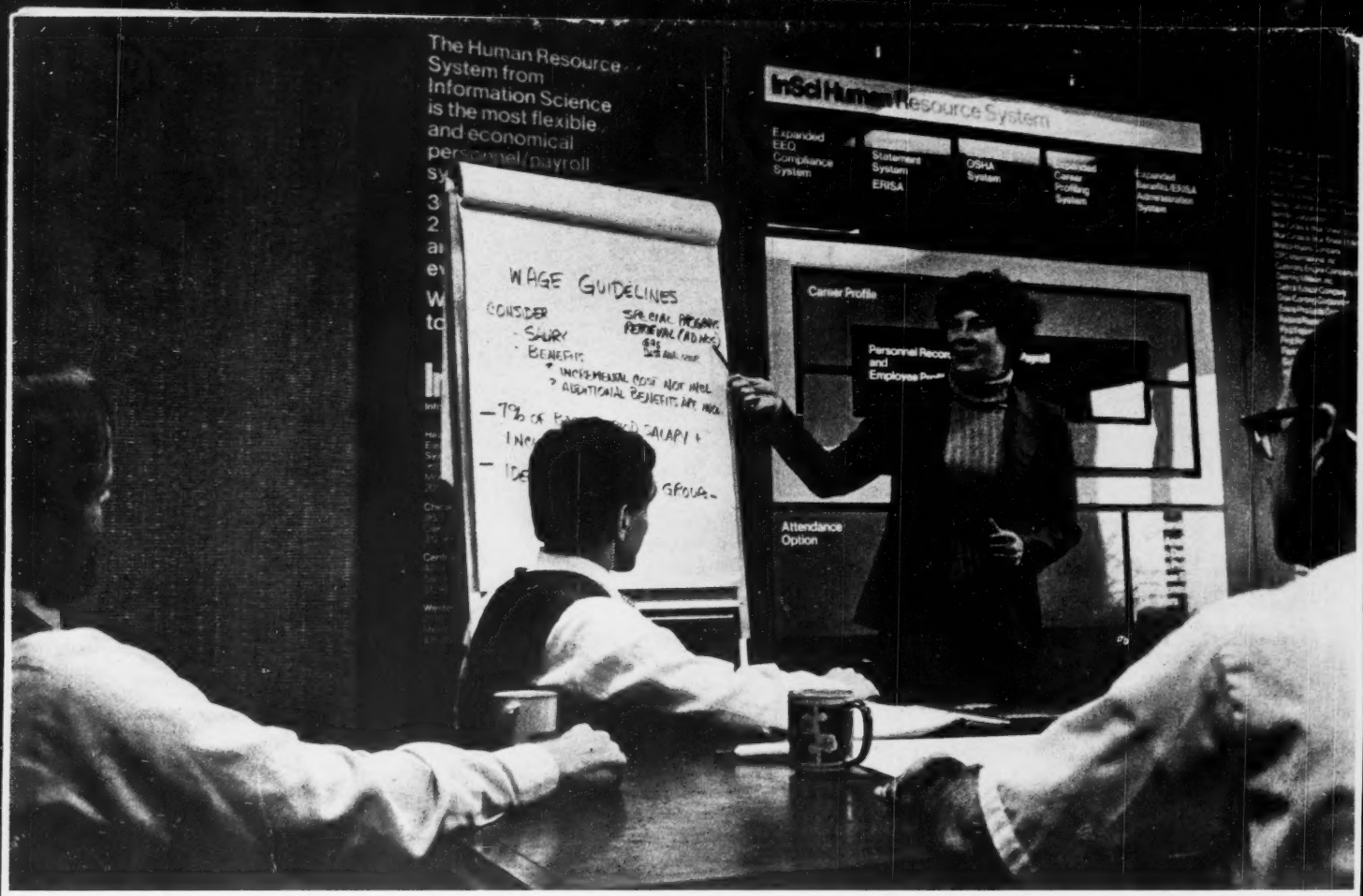
EXCH: N=NEW YORK; A=AMERICAN; P=PHIL-BALT-WASH
L=NATIONAL; M=MIDWEST; O=OVER-THE-COUNTER
O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

SOFTWARE & EDP SERVICES

EXCH		1978-79 RANGE (1)	CLOSE MAR 21 1979	WEEK NET CHNGE	WEEK PCT CHNGE
O	ADVANCED COMP TECH	1- 2	3/4	0	0.0
O	ANACOMP INC	8- 22	17 1/4	- 1/8	-0.7
A	APPLIED DATA RES.	8- 17	10 7/8	- 3/4	-6.4
N	AUTOMATIC DATA PROC	24- 36	29 3/4	+ 1/2	+1.7
C	COLEMAN AMERICAN COS	1- 2	5/8	0	0.0
C	COMPU-SERV NETWORK	5- 12	8	0	0.0
C	COMPUTER HORIZONS	1- 9	5	0	0.0
O	COMPUTER NETWORK	5- 16	5 7/8	- 1/4	-4.0
N	COMPUTER SCIENCES	8- 17	10 7/8	+ 1/8	+1.1
O	COMPUTER TASK GROUP	1- 5	4 3/4	+ 1/4	+5.5
C	COMPUTER USAGE	2- 4	3	+ 3/8	+14.2
C	COMPUT AUTO REP SVC	4- 12	8 3/4	+ 1/8	+1.4
C	COMSHARE	6- 20	19 3/4	+ 3/4	+3.9
O	CULLINANE CORP	14- 33	21 1/4	- 1/4	-1.1
O	DATA DIMENSIONS INC	4- 9	5 3/4	- 1/4	-4.1
O	DATATAB	1- 3	3 3/8	+ 3/4	+28.5
N	ELECTRONIC DATA SYS.	15- 25	19 3/4	+ 1/2	+2.5
O	INSYTE CORP	1- 3	1 1/8	+ 1/8	+12.5
C	IPS COMPUTER MARKET.	2- 3	2 3/4	- 1/4	-8.3
O	KEANE ASSOCIATES	3- 6	5	0	0.0
C	KEYDATA CORP	1- 3	2 1/4	0	0.0
A	LOGICON	10- 19	12 7/8	- 1/8	-0.9
A	NATIONAL CSS INC	15- 36	30 1/8	+ 3/4	+2.5
O	NATIONAL DATA CORP	7- 13	10	0	0.0
A	ON LINE SYSTEMS INC	12- 30	20	+ 1/8	+0.6
N	PLANNING RESEARCH	4- 10	6	+ 1/4	+4.3
C	PROGRAMMING & SYS	1- 1	1	0	0.0
C	RAPIDATA INC	3- 7	5 1/4	0	0.0
O	REYNOLDS & REYNOLD	18- 36	30	0	0.0
O	SCIENTIFIC COMPUTERS	3- 9	7 1/8	+ 1/4	+3.6
O	TYMSHARE INC	18- 41	37 1/8	+2 5/8	+7.6
A	URS SYSTEMS	5- 8	6 3/8	- 1/8	-1.9
N	WYLY CORP	1- 7	5 1/4	+ 1/2	+10.5

PERIPHERALS & SUBSYSTEMS

EXCH		1978-79 RANGE (1)	CLOSE MAR 21 1979	WEEK NET CHNGE	WEEK PCT CHNGE
N	ADDRESSOGRAPH-MULT	14- 32	19 1/4	- 3/4	-3.7
N	AMPEX CORP	10- 19	16 3/8	+ 5/8	+3.9
O	ANDERSON JACOBSON	5- 10	7	+ 1/8	+1.8
N	APPLIED DIG DATA SYS	9- 22	10 1/2	+ 1/8	+1.2
O	BEEHIVE INT'L	3- 7	4	- 1/4	-5.8
A	BOLT,BERANEK & NEW	6- 14	12 5/8	+ 1/4	+2.0
N	BUNKER-RAMO	10- 22	21 3/8	- 1/8	-0.5
A	CALCOMP	3- 13	8 1/4	- 1/4	-2.9
O	CAMBRIDGE MEMORIES	3- 9	3 5/8	- 1/8	-3.3
N	CENTRONICS DATA COMP	16- 40	39	+ 1/8	+0.3
C	COGNITRONICS	1- 4	1 1/2	0	0.0
C	COMPUTER COMMUN.	6- 10	9 1/4	- 1/8	-1.3
C	COMPUTER CONSOLES	4- 11	10 1/2	+1 3/4	+20.0
A	COMPUTER EQUIPMENT	3- 6	5 1/8	+ 1/4	+5.1
C	COMPUTER TRANSCEIVER	1- 5	2 7/8	- 1/4	-8.0
C	COMPUTERVISION CORP	9- 44	44 1/4	+8 1/4	+22.9
O	COMTEN	9- 38	24 1/4	0	0.0
A	CONRAC CORP	13- 26	14 7/8	- 1/8	-0.8
O	DATA ACCESS SYSTEMS	3- 14	9 1/2	- 1/2	-5.0
O	DATA 100	9- 20	19 1/2	0	0.0
A	DATA PRODUCTS CORP	14- 29	17 5/8	-1 3/8	-7.2
O	DATUM INC	2- 6	2 5/8	- 1/8	-4.5
O	DECISION DATA COMPUT	2- 6	3 5/8	0	0.0
O	DELTA DATA SYSTEMS	1- 1	3/8	0	0.0
A	DOCUMATION INC	6- 34	19 7/8	-1	-4.7
O	DATARAM CORP	6- 32	16 1/2	+ 3/4	+4.7
N	ELECTRONIC M & M	4- 9	4 3/8	- 1/8	-2.7
O	FABRI-TEK	1- 2	3/4	+	+8.3
O	GENERAL COMPUTER SYS	1- 3	2 1/4	0	0.0
O	GENERAL DATACOMM IND	9- 21	16	+ 1/2	+3.2
N	HAZELTINE CORP	10- 17	15 1/4	+ 1/2	+3.3
N	HARRIS CORP	17- 36	26 3/4	+ 7/8	+3.3
O	INFOREX INC	6- 11	8 1/8	- 1/4	-2.9
O	INFORMATION INTL INC	7- 12	10 1/2	+ 1/2	+5.0
O	INFOTON	1- 3	3 1/8	+ 1/4	+8.6
O	INTEL CORP	39- 63	62	+ 1/2	+0.8
O	INTERSIL	7- 18	13 5/8	- 1/8	-0.9
A	LUNDY ELECTRONICS	10- 19	10 1/4	- 1/4	-2.3
O	MSI DATA CORP	27- 59	32 1/2	- 3/4	-2.2
N	MEMOREX	6- 15	11 1/4	- 1/8	-1.0
N	MOHAWK DATA SCI	2- 6	6	0	0.0
O	OMEX	9- 17	13 5/8	0	0.0
C	PARADYNE CORP	5- 12	9 3/4	+ 1/4	+2.6
O	PENRIL CORP	9- 17	9	- 7/8	-8.8
N	PERTEC CORP	2- 2	1 3/4	0	0.0
A	POTTER INSTRUMENT	2- 5	2 3/4	0	0.0
C	QUANTOR CORP	7- 13	8 1/8	+ 1/8	+1.5
C	RECOGNITION EQUIP	1- 5	2 3/8	- 1/4	-9.5
O	SCAN DATA	19- 46	38 1/8	+3 1/2	+10.1
N	STORAGE TECHNOLOGY	11- 21	20	- 1/4	-1.2
O	T BAR INC	4- 14	10 3/4	0	0.0
O	TALLY CORP.	6- 13	7	0	0.0
A	TEC INC	33- 55	55 1/4	+2	+3.7
N	TEKTRONIX INC	3- 9	5 1/2	+ 1/8	+2.3
N	TELEX	13- 23	14 1/2	- 1/4	-1.6
C	TeSCATA SYSTEMS CP	1- 2	5/8	- 1/8	-16.6
O	WILTEK INC	1- 2	3/4	0	0.0
	SUPPL	6- 11	9	0	0.0
A	AMERICAN BUS PRODS	1- 4	1 1/2	+ 1/8	+9.0
C	BALTIMORE BUS FORMS	14- 34	14 7/8	- 1/8	-0.8
N	BARRY WRIGHT	1- 1	3/4	+ 1/8	+20.0
O	CYBERNETICS INC	13- 30	19 3/8	+ 1/8	+0.6
O	DUPLEX PRODUCTS INC	8- 19	18 3/4	+2 1/2	+15.3
N	ENNIS BUS. FORMS	43- 66	58	- 5/8	-1.0
N	3M COMPANY	26- 34	31 3/4	+1 3/4	+5.8
C	MOORE CORP LTD	18- 37	24 1/4	- 1/2	-2.0
N	NASHUA CORP	20- 27	24 1/2	- 1/2	-2.0
C	STANDARD REGISTER	8- 16	12 1/2	- 3/8	-2.9
A	TAB PRODUCTS CO	19- 52	51 1/2	0	0.0
N	UARCO	10- 22	15 3/8	+ 3/8	+2.5
A	WABASH MAGNETICS	18- 33	25 5/8	+ 3/4	+3.0
N	WALLACE BUS FORMS	18- 33	24 7/8	+ 5/8	+2.5



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